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Environmental Radiation Data
Report 39, July-September 1984

Eastern Environmental Radiation Facility
Montgomery, AL

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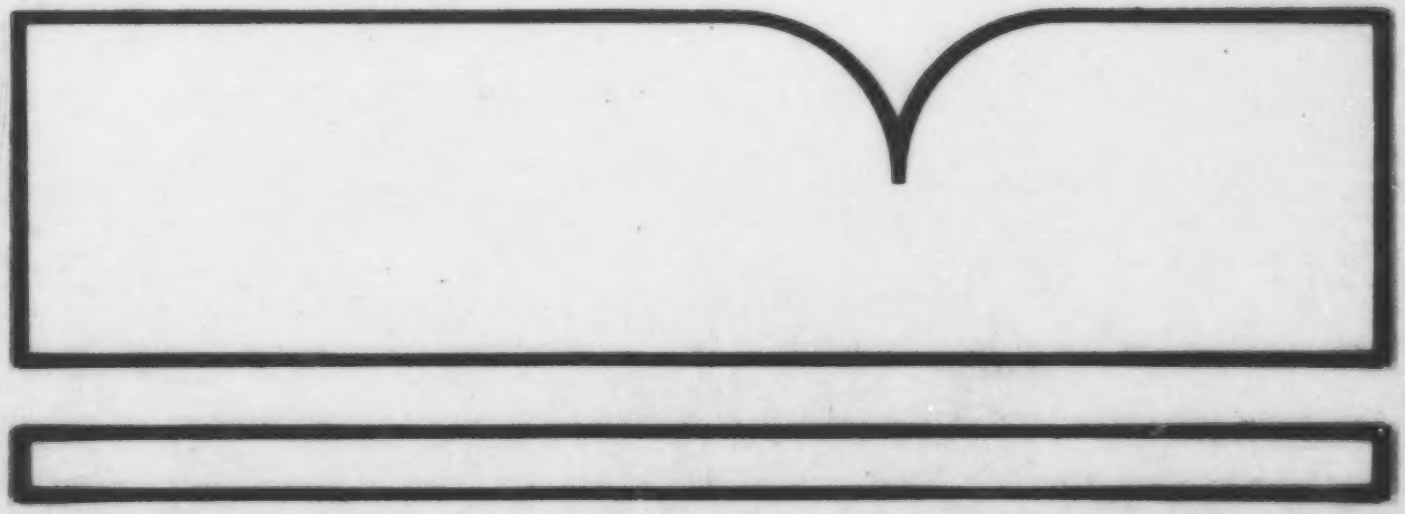

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Report 39

July - September 1984

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Environmental Radiation Data (ERD) is compiled and distributed quarterly by the Office of Radiation Programs' Eastern Environmental Radiation Facility (EERF). Montgomery, Alabama, and contains data from the Environmental Raidation Ambient Monitoring System (ERAMS). Data from similar networks operated by contributing States, Canada, Mexico, and the Pan American Health Organization are reported in the ERD when available.

ERAMS was established in 1973 by the U.S. Environmental Protection Agency's Office of Radiation Programs (ORP). The ERAMS is comprised of nationwide sampling stations that provide air, surface and drinking water, and milk samples from which environmental radiation levels are derived. The major emphasis for ERAMS is toward identifying trends in the accumulation of long-lived radionuclides in the environment.

Sampling locations are selected to provide optimal population coverage while functioning to monitoring fallout from nuclear devices and other forms of radioactive contamination of the environment. The radiation analyses performed on these samples include gross alpha and goss beta levels, gamma analyses for fission products, and specific analyses for uranium, plutonium, strontium, iodine, radium, krypton, and tritium.

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E N V I R O N M E N T A L

R A D I A T I O N

D A T A

REPORT 39

July - September 1984

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Office of Radiation Programs

Preface

Environmental Radiation Data (ERD) is compiled and distributed quarterly by the Office of Radiation Programs' Eastern Environmental Radiation Facility (EERF), Montgomery, Alabama, and contains data from the Environmental Radiation Ambient Monitoring System (ERAMS). Data from similar networks operated by contributing States, Canada, Mexico, and the Pan American Health Organization are reported in the ERD when available.

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Sampling locations are selected to provide optimal population coverage while functioning to monitor fallout from nuclear devices and other forms of radioactive contamination of the environment. The radiation analyses performed on these samples include gross alpha and gross beta levels, gamma analyses for fission products, and specific analyses for uranium, plutonium, strontium, iodine, radium, krypton, and tritium. This monitoring effort also provides ancillary information on natural background levels and on releases into the environment from stationary sources such as nuclear power reactors, fuel fabrication facilities, and reprocessing plants.

ENVIRONMENTAL RADIATION

DATA

CONTENTS

	Page
DATA - Reporting Rationale and Procedures	vii
- Table of Reporting Increments and Minimum Detectable Levels	vii
DATA - ERAMS	
SECTION I. Air Program	1
1. Airborne Particulates and Precipitation	1
2. Plutonium and Uranium in Airborne Particulates	14
3. Krypton-85	15
SECTION II. Water Program	16
1. Surface Water	16
2. Drinking Water	21
SECTION III. External Gamma Ambient Monitoring Program	31

SECTION IV. Milk Program 34

1. Pasteurized Milk 34

2. Strontium-89 and -90 in Milk 41

3. Carbon-14 in Milk 43

DATA ♦ Reporting Rationale and Procedures

The U.S. Environmental Protection Agency's Office of Radiation Programs, in 1973, established the Environmental Radiation Monitoring System(ERAMS) to provide continuous, accurate, and usable environmental radiation data to the public. Thus, ERAMS data for all specific radionuclide analyses are reported as the counting results indicate, whether the numbers are negative, zero, or positive.

Reporting Rationale

Frequently, concentrations of a radionuclide in environmental media are close to zero. When the actual concentration of a nuclide is zero, the net counting results should statistically show a distribution of negative and positive numbers about zero. This occurs when the background count is subtracted from a sample which has only background activity. Prior to July 1975, ERAMS data were not reported numerically when the results were less than a specified reporting level or minimum detectable level. The present reporting procedure allows all the data to be reported and evaluated statistically without an arbitrary cutoff of small or negative numbers. This approach will facilitate estimates of bias in the nuclide analyses and will allow better evaluation of distributions and trends in environmental data.

When reviewing the data in this report, caution should be exercised in the interpretation of individual negative values. Obviously, a negative activity value does not have physical significance. Such numbers, however, are significant when taken together with other observations which indicate that the true value of a distribution is near zero. When an average of several measurements produces a result less than zero, this indicates a negative bias in the measurement procedure.

(1) Reported Values

Specific Analyses ♦ All specific radionuclide analyses will be reported as the counting results indicate, whether the number is negative, zero, or positive. All reported values are corrected for decay to the collection date.

Gross Analyses - The actual value of gross radioactivity measurements will be reported, unless the value is below the minimum detectable level (MDL) at the 2 sigma confidence level, then < minimum detectable level will be reported.

MDL is defined as the 3 sigma error of the background. A tabulation of MDL's is given in the following table.

(2) Reported Error Terms

Each reported value for specific analyses will be accompanied by a counting error term at the 2 sigma (95%) confidence interval. Potassium concentrations are determined by specific activity analyses. Error terms are therefore reported as counting errors. At the very low levels characteristic of most ERAMS measurements, counting error is the greatest contributor to overall error.

(3) Significant Figures

All reported values will be rounded to no more than three significant figures. The last significant figure will be increased by one if the figure following is five or greater, otherwise it is left unchanged.

(4) Reporting Levels

The reporting units, smallest increments for reporting, and minimum detectable levels for each isotope are shown in table 1. Smallest increments are sometimes considerably smaller than minimum detectable amounts to avoid truncation errors in averaging.

(5) Averages

Averages will be calculated along with appropriate error terms in an annual summary and analysis of ERAMS data. In calculating these averages, all values of individual data including negative numbers will be utilized. Averages will not be included in ERD quarterly reports.

TABLE 1

ERAMS Reporting Increments and Minimum Detectable Levels for Radionuclide Analyses

Radionuclide	Media	Reporting Units	Reporting Increments	Minimum Detectable Levels
Gross alpha	Water	pCi/l	1 pCi/l	2 pCi/l
Gross beta	Air	pCi/m^3	.01 pCi/m^3	.01 pCi/m^3
	Water	pCi/l	1 pCi/l	1 pCi/l
	Precipitation	nCi/m^2	.01 nCi/m^2	.01 nCi/m^2(a)
Tritium	Water	nCi/l	.1 nCi/l	.2 nCi/l
	Milk	nCi/l	.1 nCi/l	.2 nCi/l
Carbon-14	Milk	pCi/l	1 pCi/l	15 pCi/l
Krypton-85	Ambient Air	pCi/m^3	.1 pCi/m^3	2 pCi/m^3
Plutonium-238, 239	Air	aCi/m^3	.1 aCi/m^3	.015 pCi(b) per sample
	Milk	pCi/l	.001 pCi/l	.015 pCi per sample
	Water	pCi/l	.001 pCi/l	.015 pCi per sample
Uranium-234, 235,238	Air	aCi/m^3	.1 aCi/m^3	.015 pCi(b) per sample
	Milk	pCi/l	.001 pCi/l	.015 pCi per sample
	Water	pCi/l	.001 pCi/l	.015 pCi per sample
Radium-226	Water	pCi/l	.1 pCi/l	.1 pCi/l

Radionuclide	Media	Reporting Units	Reporting Increments	Minimum Detectable Levels
Strontium-90	Milk	pCi/l	.1 pCi/l	1 pCi/l
	Water	pCi/l	.1 pCi/l	1 pCi/l
Strontium-89	Milk	pCi/l	1 pCi/l	5 pCi/l(c)
Iodine-131	Milk	pCi/l	1 pCi/l	10 pCi/l(c)
	Water	pCi/l	1 pCi/l	10 pCi/l(c)
	Water (specific radiochemical analysis)	pCi/l	.1 pCi/l	.4 pCi/l
Iodine-129	Milk	fCi/l	.1 fCi/l	.4 fCi/l
Cesium-137	Milk	pCi/l	1 pCi/l	10 pCi/l
	Water	pCi/l	1 pCi/l	10 pCi/l
Barium-140	Milk	pCi/l	1 pCi/l	10 pCi/l(c)
	Water	pCi/l	1 pCi/l	10 pCi/l(c)
Potassium	Milk	g/l	.1 g/l	.12 g/l
	Water	g/l	.1 g/l	.12 g/l
Potassium-40	Water	pCi/l	1 pCi/l	100 pCi/l

(a) The value in terms of nCi/m^2 would be dependent on precipitation (mm).
(b) This value in terms of pCi/m^3 would be dependent on the air volume.
(c) Activity as of the day of counting.

ENVIRONMENTAL RADIATION AMBIENT MONITORING SYSTEM (ERAMS)

SECTION I. Air Program

Airborne Particulates and Precipitation

Gross beta radioactivity measurements and certain specific analyses are performed on air particulates and precipitation samples as indicator measurements in assessing the general (national) impact of all contributing sources on environmental levels of radiation.

Airborne particulates are collected continuously at field stations representing wide geographic coverage, including present and potential sources of environmental radioactivity. Sampling sites are located throughout the United States, Virgin Islands, and the Panama Canal.

Filters (10•cm diameter synthetic fiber) from air samplers are changed twice weekly and field measurements are made with a G•M survey meter at 5 hours and 29 hours after collection to allow for radon and thoron daughter product decay. Field estimates are reported to appropriate EPA officials by telephone or mail depending on the activity levels found.

The filters are sent to EERF for more sensitive analyses in a low background beta counter. Gamma scans are performed on all filters showing laboratory gross beta counts greater than 1 pCi/m^3. The lower gross beta values reported for laboratory measurements are largely due to the decay of radionuclides which occurred between the times of the field estimates and laboratory measurements.

Precipitation samples are collected at the field stations where air filters are collected. These samples are also sent to EERF where they are composited monthly for tritium, gross beta activity measurements and gamma scans. Plutonium•238, •239, and uranium•234, •235, and •238 analyses are performed on samples which exceed 2 pCi/liter gross alpha.

Tables 2 - 4 present the monthly average gross beta concentrations in airborne particulates for July - September 1984.

Tables 5 - 7 present the monthly average gross beta concentration in precipitation July - September 1984.

The tritium in precipitation samples for July - September 1984 at the selected stations are shown in Table 8.

A compilation of individual measurements is available from the EPA, EERF, Montgomery, AL 36109.

TABLE 2

AIRBORNE PARTICULATES
GROSS BETA CONCENTRATION
JULY 1984

LOCATION	# SAM	5+HR FIELD ESTIMATE			EERF LAB MEASUREMENT		
		MAX	MIN	AVG	MAX	MIN	AVG
		(pCi/m^3)			(pCi/m^3)		
AL:MONTGOMERY	9	0.9	0.1	0.5	0.01	0.01	0.01
CA:BERKELEY	8	0.0	0.0	0.0	0.01	0.00	0.00
CA:LOS ANGELES	9	0.4	0.0	0.2	0.01	0.00	0.01
CO:DENVER	9	0.0	0.0	0.0	0.02	0.01	0.01
CT:HARTFORD	9	0.2	0.1	0.2	0.01	0.00	0.01
DE:WILMINGTON	9	0.5	0.1	0.2	0.01	0.00	0.01
FL:JACKSONVILLE	1	0.0	0.0	0.0	0.01	0.01	0.01
FL:MIAMI	9	0.0	0.0	0.0	0.01	0.00	0.01
GA:ATLANTA	3	0.1	0.0	0.0	0.01	0.01	0.01
HI:HONOLULU	9	0.1	0.0	0.1	0.01	0.00	0.01
IA:IOWA CITY	9	0.6	0.2	0.3	0.02	0.01	0.01
ID:BOISE	9	1.0	0.3	0.4	0.02	0.01	0.01
ID:IDAHO FALLS	9	0.0	0.0	0.0	0.01	0.01	0.01
IL:CHICAGO	9	0.4	0.1	0.2	0.03	0.00	0.01
IN:INDIANAPOLIS	2	0.5	0.1	0.3	0.01	0.01	0.01
KS:TOPEKA	8	1.4	0.2	0.7	0.01	0.00	0.00
ME:AUGUSTA	9	0.2	0.1	0.2	0.01	0.01	0.01
MI:LANSING	9	0.6	0.1	0.4	0.03	0.00	0.01
MN:MINNEAPOLIS	9	0.6	0.1	0.3	0.03	0.01	0.01
MO:JEFFERSON CITY	7	1.9	0.2	0.9	0.14	0.01	0.04
MS:JACKSON	7	0.7	0.2	0.4	0.04	0.01	0.02
NC:CHARLOTTE	6	0.1	0.0	0.1	0.01	0.01	0.01
NC:WILMINGTON	9	0.0	0.0	0.0	0.01	0.00	0.01
ND:BISMARCK	9	1.0	0.0	0.3	0.02	0.01	0.01
NH:CONCORD	9	0.3	0.0	0.1	0.01	0.00	0.01
NJ:TRENTON	9	0.4	0.1	0.2	0.01	0.00	0.01
NM:SANTA FE	7	0.6	0.2	0.3	0.01	0.01	0.01
NV:LAS VEGAS	9	0.2	0.0	0.1	0.03	0.01	0.01
NY:ALBANY	4	0.2	0.1	0.1	0.01	0.01	0.01
NY:NEW YORK CITY	9	0.2	0.1	0.1	0.02	0.00	0.01
NY:NIAGARA FALLS	9	0.5	0.2	0.3	0.02	0.01	0.01
NY:SYRACUSE	5	0.1	0.1	0.1	0.02	0.00	0.01
NY:YAPHANK	5	0.1	0.0	0.0	0.01	0.00	0.01
OH:COLUMBUS	9	0.8	0.2	0.5	0.03	0.01	0.01
OH:PAINESVILLE	3	0.2	0.1	0.2	0.01	0.01	0.01
OH:TOLEDO	9	1.2	0.2	0.5	0.04	0.01	0.02
OK:OKLAHOMA CITY	4	1.3	0.5	0.9	0.02	0.01	0.02
OR:PORTLAND	9	0.0	0.0	0.0	0.01	0.00	0.00

TABLE 2 (CONTINUED)

AIRBORNE PARTICULATES
GROSS BETA CONCENTRATION
JULY 1984

LOCATION	# SAM	5-HR FIELD ESTIMATE MAX	MIN	AVG	EERF LAB MEASUREMENT MAX	MIN	AVG
		($pC1/m^3$)			($pC1/m^3$)		
PA:HARRISBURG	9	0.5	0.0	0.2	0.01	0.01	0.01
RI:PROVIDENCE	4	0.1	0.1	0.1	0.01	0.01	0.01
SC:BARNWELL	2	0.0	0.0	0.0	0.01	0.00	0.00
SC:COLUMBIA	8	0.1	0.1	0.1	0.01	0.01	0.01
SD:PIERRE	8	0.4	0.1	0.3	0.02	0.01	0.01
TN:KNOXVILLE	7	0.4	0.1	0.3	0.02	0.01	0.01
TN:NASHVILLE	4	1.0	0.5	0.7	0.01	0.01	0.01
TX:AUSTIN	9	1.2	0.4	0.7	0.05	0.01	0.02
TX:EL PASO	9	0.6	0.2	0.4	0.02	0.01	0.01
VA:LYNCHBURG	10	1.1	0.3	0.6	0.01	0.00	0.01
VA:VIRGINIA BEACH	4	0.1	0.1	0.1	0.01	0.00	0.01
WA:SEATTLE	8	0.0	0.0	0.0	0.00	0.00	0.00
WA:SPOKANE	9	0.3	0.2	0.3	0.01	0.01	0.01
WI:MADISON	8	0.5	0.1	0.3	0.01	0.00	0.01
WV:CHARLESTON	5	0.6	0.1	0.3	0.02	0.01	0.01

MINIMUM DETECTABLE LIMIT FOR FIELD ESTIMATES = .1 $pC1/m^3$
MINIMUM DETECTABLE LIMIT FOR LAB MEASUREMENT = .01 $pC1/m^3$

TABLE 3

AIRBORNE PARTICULATES
GROSS BETA CONCENTRATION
AUGUST 1984

LOCATION	# SAM	5-HR FIELD ESTIMATE			EERF LAB MEASUREMENT		
		MAX	MIN	AVG	MAX	MIN	AVG
		(pCi/m^3)			(pCi/m^3)		
AL:MONTGOMERY	9	2.1	0.1	0.7	0.02	0.00	0.01
CA:BERKELEY	9	0.1	0.0	0.0	0.00	0.00	0.00
CA:LOS ANGELES	9	0.4	0.1	0.3	0.01	0.01	0.01
CO:DENVER	7	0.0	0.0	0.0	0.02	0.01	0.02
CT:HARTFORD	9	0.4	0.1	0.3	0.01	0.00	0.01
DE:WILMINGTON	5	0.5	0.1	0.2	0.02	0.01	0.01
FL:JACKSONVILLE	2	0.2	0.1	0.2	0.02	0.01	0.01
FL:MIAMI	9	0.0	0.0	0.0	0.02	0.00	0.01
HI:HONOLULU	9	0.3	0.0	0.1	0.01	0.00	0.01
IA:IOWA CITY	9	0.7	0.0	0.3	0.02	0.01	0.02
ID:BOISE	9	0.7	0.2	0.4	0.02	0.01	0.02
ID:IDAHO FALLS	8	0.0	0.0	0.0	0.02	0.01	0.01
IL:CHICAGO	6	0.7	0.0	0.3	0.02	0.01	0.02
IN:INDIANAPOLIS	7	1.1	0.4	0.7	0.03	0.01	0.02
KS:TOPEKA	9	1.9	0.3	0.8	0.01	0.00	0.00
ME:AUGUSTA	9	0.6	0.1	0.3	0.03	0.00	0.01
MI:LANSING	9	1.0	0.2	0.5	0.02	0.01	0.01
MN:MINNEAPOLIS	8	0.5	0.3	0.4	0.03	0.01	0.02
MO:JEFFERSON CITY	9	2.1	0.4	1.2	0.04	0.01	0.02
MS:JACKSON	8	0.9	0.1	0.4	0.08	0.01	0.02
NC:CHARLOTTE	6	0.4	0.0	0.2	0.06	0.01	0.02
NC:WILMINGTON	9	0.1	0.0	0.1	0.02	0.01	0.01
ND:BISMARCK	6	0.8	0.1	0.4	0.03	0.01	0.02
NH:CONCORD	9	0.4	0.1	0.3	0.01	0.01	0.01
NJ:TRENTON	9	0.6	0.1	0.4	0.01	0.00	0.01
NM:SANTA FE	5	0.6	0.2	0.3	0.01	0.01	0.01
NV:LAS VEGAS	9	0.3	0.1	0.2	0.01	0.01	0.01
NY:ALBANY	4	0.1	0.0	0.1	0.02	0.01	0.01
NY:NEW YORK CITY	9	0.2	0.1	0.1	0.02	0.01	0.01
NY:NIAGARA FALLS	9	0.7	0.1	0.3	0.02	0.01	0.01
NY:SYRACUSE	4	0.2	0.0	0.1	0.01	0.01	0.01
NY:YAPHANK	7	0.1	0.0	0.0	0.01	0.00	0.01
OH:COLUMBUS	9	1.1	0.2	0.6	0.03	0.01	0.02
OH:PAINESVILLE	9	0.9	0.1	0.3	0.02	0.01	0.01
OH:TOLEDO	9	1.5	0.1	0.6	0.02	0.01	0.01
OK:OKLAHOMA CITY	8	1.1	0.3	0.6	0.04	0.01	0.01
OR:PORTLAND	7	0.0	0.0	0.0	0.01	0.00	0.00

TABLE 3 (CONTINUED)

AIRBORNE PARTICULATES
GROSS BETA CONCENTRATION
AUGUST 1984

LOCATION	# SAM	5-HR FIELD ESTIMATE			EERF LAB MEASUREMENT		
		MAX	MIN	AVG	MAX	MIN	AVG
		(pCi/m^3)			(pCi/m^3)		
PA:HARRISBURG	5	0.6	0.2	0.4	0.01	0.01	0.01
RI:PROVIDENCE	4	0.3	0.0	0.1	0.01	0.01	0.01
SC:BARNWELL	2	0.2	0.0	0.1	0.01	0.00	0.00
SC:COLUMBIA	9	0.5	0.1	0.3	0.03	0.01	0.02
SD:PIERRE	3	1.1	0.4	0.7	0.02	0.01	0.02
TN:KNOXVILLE	8	1.0	0.1	0.4	0.02	0.01	0.01
TN:NASHVILLE	1	0.0	0.0	0.0	0.00	0.00	0.00
TX:AUSTIN	9	1.7	0.6	1.0	0.05	0.00	0.02
TX:EL PASO	9	0.5	0.1	0.3	0.02	0.01	0.01
VA:LYNCHBURG	6	1.3	0.2	0.7	0.01	0.01	0.01
VA:VIRGINIA BEACH	2	0.1	0.1	0.1	0.01	0.00	0.00
WA:SEATTLE	6	0.1	0.0	0.0	0.01	0.00	0.00
WA:SPOKANE	9	0.4	0.2	0.3	0.01	0.01	0.01
WI:MADISON	9	1.9	0.2	0.7	0.02	0.00	0.01
WV:CHARLESTON	9	0.8	0.0	0.3	0.02	0.01	0.01

MINIMUM DETECTABLE LIMIT FOR FIELD ESTIMATES = .1 pCi/m^3
MINIMUM DETECTABLE LIMIT FOR LAB MEASUREMENT = .01 pCi/m^3

TABLE 4

AIRBORNE PARTICULATES
GROSS BETA CONCENTRATION
SEPTEMBER 1984

LOCATION	# SAM	5-HR FIELD ESTIMATE			EERF LAB MEASUREMENT		
		MAX	MIN	AVG	MAX	MIN	AVG
		(pCi/m^3)			(pCi/m^3)		
AL:MONTGOMERY	8	2.3	0.4	1.1	0.02	0.01	0.01
AR:LITTLE ROCK	4	0.2	0.1	0.2	0.01	0.01	0.01
CA:BERKELEY	8	0.1	0.0	0.1	0.02	0.00	0.01
CA:LOS ANGELES	8	0.8	0.2	0.4	0.02	0.01	0.01
CO:DENVER	7	0.0	0.0	0.0	0.04	0.01	0.02
CT:HARTFORD	8	0.6	0.2	0.3	0.01	0.00	0.01
DE:WILMINGTON	7	0.4	0.1	0.2	0.01	0.01	0.01
FL:JACKSONVILLE	8	0.1	0.0	0.0	0.02	0.01	0.01
FL:MIAMI	8	0.0	0.0	0.0	0.01	0.00	0.00
HI:HONOLULU	8	0.3	0.1	0.2	0.01	0.00	0.01
IA:IOWA CITY	8	0.5	0.0	0.2	0.01	0.00	0.01
ID:BOISE	8	0.7	0.1	0.4	0.03	0.01	0.02
ID:IDAHO FALLS	8	0.0	0.0	0.0	0.02	0.00	0.01
IL:CHICAGO	8	0.4	0.1	0.2	0.02	0.01	0.01
IN:INDIANAPOLIS	7	1.4	0.0	0.4	0.02	0.01	0.01
KS:TOPEKA	8	0.9	0.1	0.4	0.00	0.00	0.00
ME:AUGUSTA	8	0.6	0.1	0.3	0.01	0.01	0.01
MI:LANSING	8	0.4	0.1	0.3	0.01	0.01	0.01
MN:MINNEAPOLIS	8	0.6	0.1	0.3	0.01	0.01	0.01
MO:JEFFERSON CITY	8	1.6	0.2	0.7	0.02	0.01	0.02
MS:JACKSON	8	1.0	0.2	0.6	0.03	0.01	0.02
NC:CHARLOTTE	8	0.3	0.0	0.1	0.05	0.01	0.02
NC:WILMINGTON	6	0.1	0.0	0.1	0.02	0.01	0.01
ND:BISMARCK	6	0.6	0.1	0.3	0.02	0.00	0.01
NH:CONCORD	8	0.4	0.1	0.2	0.01	0.00	0.01
NJ:TRENTON	7	1.0	0.3	0.6	0.01	0.01	0.01
NM:SANTA FE	4	0.6	0.2	0.4	0.01	0.01	0.01
NV:LAS VEGAS	8	0.4	0.2	0.3	0.02	0.01	0.01
NY:ALBANY	4	0.1	0.0	0.1	0.01	0.01	0.01
NY:NEW YORK CITY	8	0.3	0.0	0.2	0.02	0.01	0.01
NY:NIAGARA FALLS	8	0.2	0.0	0.1	0.02	0.01	0.01
NY:SYRACUSE	6	0.1	0.0	0.1	0.01	0.01	0.01
NY:YAPHANK	8	0.1	0.0	0.0	0.01	0.00	0.01
OH:COLUMBUS	8	1.0	0.1	0.4	0.03	0.01	0.02
OH:PAINESVILLE	8	0.4	0.1	0.2	0.02	0.01	0.01
OH:TOLEDO	7	0.5	0.1	0.3	0.03	0.01	0.02
OK:OKLAHOMA CITY	3	0.8	0.6	0.7	0.04	0.01	0.02
OR:PORTLAND	8	0.0	0.0	0.0	0.01	0.00	0.00

TABLE 4 (CONTINUED)

AIRBORNE PARTICULATES
GROSS BETA CONCENTRATION
SEPTEMBER 1984

LOCATION	# SAM	5-HR FIELD ESTIMATE			EERF LAB MEASUREMENT		
		MAX	MIN	AVG	MAX	MIN	AVG
		(pCi/m^3)			(pCi/m^3)		
PA:HARRISBURG	8	0.8	0.2	0.4	0.02	0.01	0.01
RI:PROVIDENCE	5	0.8	0.1	0.3	0.01	0.01	0.01
SC:BARNWELL	2	0.1	0.0	0.1	0.05	0.00	0.03
SC:COLUMBIA	8	1.0	0.1	0.3	0.03	0.01	0.02
TN:KNOXVILLE	8	1.5	0.1	0.7	0.02	0.01	0.01
TN:NASHVILLE	4	0.3	0.3	0.3	0.02	0.01	0.01
TX:AUSTIN	8	2.0	0.1	1.1	0.04	0.01	0.01
TX:EL PASO	8	0.7	0.2	0.5	0.02	0.01	0.02
VA:LYNCHBURG	8	1.6	0.0	0.6	0.03	0.01	0.01
VA:VIRGINIA BEACH	2	0.1	0.1	0.1	0.01	0.00	0.00
WA:SEATTLE	8	0.1	0.0	0.0	0.01	0.00	0.00
WA:SPOKANE	8	0.8	0.2	0.4	0.02	0.01	0.01
WI:MADISON	8	0.7	0.2	0.5	0.01	0.00	0.01
WV:CHARLESTON	6	0.6	0.1	0.4	0.03	0.01	0.02

MINIMUM DETECTABLE LIMIT FOR FIELD ESTIMATES ≈ .1 pCi/m^3
MINIMUM DETECTABLE LIMIT FOR LAB MEASUREMENT ≈ .01 pCi/m^3

TABLE 5

GROSS BETA CONCENTRATION IN PRECIPITATION

JULY 1984

LOCATION	DEPTH (mm)	ACT. ± 2s (nCi/m^2)		SPECIFIC GAMMA ACT. (pCi/l)
AL:MONTGOMERY	140.0	0.13	0.06	ND
CO:DENVER	47.4	0.06	0.02	ND
CT:HARTFORD	102.5	0.12	0.05	ND
DC:WASHINGTON	90.0	0.16	0.05	ND
DE:WILMINGTON	155.0	0.32	0.09	ND
FL:JACKSONVILLE	11.1	0.01	0.00	ND
FL:MIAMI	93.1	0.11	0.05	ND
GA:ATLANTA	85.0	0.16	0.04	ND
ID:BOISE	26.3	0.07	0.02	ND
ID:IDAHO FALLS	47.5	0.06	0.02	ND
IL:CHICAGO	56.3	0.12	0.04	ND
IN:INDIANAPOLIS	18.2	0.06	0.01	ND
MI:LANSING	12.0	0.03	0.01	ND
MN:MINNEAPOLIS	81.7	0.13	0.04	ND
MS:JACKSON	28.0	0.03	0.01	ND
ND:BISMARCK	7.5	0.03	0.01	ND
NH:CONCORD	167.8	0.33	0.09	ND
NJ:TRENTON	83.3	0.24	0.05	ND
NV:LAS VEGAS	107.5	0.25	0.06	ND
NY:ALBANY	56.6	0.19	0.04	ND
NY:NEW YORK CITY	55.0	0.07	0.03	ND
NY:NIAGARA FALLS	32.6	0.02	0.01	ND
NY:YAPHANK	136.3	0.17	0.07	ND
OH:COLUMBUS	48.3	0.05	0.02	ND
OH:PAINESVILLE	74.4	0.08	0.04	ND
OR:PORTLAND	32.5	0.01	0.01	ND
PA:HARRISBURG	140.8	0.31	0.08	ND
SC:BARNWELL	60.0	0.03	0.02	ND
SC:COLUMBIA	354.5	0.88	0.21	ND
SD:PIERRE	30.0	0.02	0.01	ND
TN:KNOXVILLE	50.0	0.06	0.03	ND
TN:NASHVILLE	12.8	0.02	0.01	ND
TX:AUSTIN	10.0	0.04	0.01	ND
TX:EL PASO	5.0	0.01	0.00	ND
VA:LYNCHBURG	51.5	0.43	0.05	ND
VA:VIRGINIA BEACH	197.5	0.48	0.11	ND
WA:SEATTLE	13.8	0.01	0.01	ND
WI:MADISON	121.3	0.11	0.06	ND

ND NO GAMMA ACTIVITY DETECTABLE
s SIGMA COUNTING ERROR

TABLE 6

GROSS BETA CONCENTRATION IN PRECIPITATION

AUGUST 1984

LOCATION	DEPTH (mm)	ACT. ± 2s (nCi/m^2)		SPECIFIC GAMMA ACT. (pCi/l)
AL:MONTGOMERY	155.0	0.11	0.08	ND
CO:DENVER	41.8	0.05	0.02	ND
CT:HARTFORD	15.6	0.06	0.01	ND
DE:WILMINGTON	113.3	0.51	0.08	ND
FL:MIAMI	106.3	0.12	0.06	ND
ID:BOISE	16.3	0.06	0.01	ND
ID:IDAHO FALLS	44.5	0.03	0.02	^{214}Bi 118 ± 80%
IL:CHICAGO	17.7	0.08	0.01	ND
IN:INDIANAPOLIS	23.1	0.03	0.01	ND
MI:LANSING	126.0	0.36	0.08	ND
MN:MINNEAPOLIS	58.7	0.07	0.03	ND
MS:JACKSON	148.1	0.04	0.05	ND
NH:CONCORD	27.0	0.09	0.02	ND
NJ:TRENTON	31.4	0.16	0.02	ND
NV:LAS VEGAS	25.0	0.02	0.01	ND
NY:ALBANY	40.0	0.06	0.02	ND
NY:NEW YORK CITY	43.0	0.05	0.02	ND
NY:NIAGARA FALLS	101.7	0.06	0.05	ND
NY:YAPHANK	16.3	0.04	0.01	ND
OH:COLUMBUS	79.3	0.09	0.04	ND
OH:PAINESVILLE	105.6	0.15	0.05	ND
OH:TOLEDO	70.0	0.11	0.04	ND
PA:HARRISBURG	82.0	0.34	0.06	ND
RI:PROVIDENCE	60.0	0.69	0.07	ND
SC:BARNWELL	90.0	0.16	0.05	^{214}Bi 64 ± 66%
SC:COLUMBIA	87.5	0.30	0.06	ND
SD:PIERRE	32.5	0.01	0.01	ND
TN:KNOXVILLE	43.7	0.06	0.02	ND
TN:NASHVILLE	8.0	0.01	0.00	ND
TX:AUSTIN	10.0	0.02	0.01	ND
TX:EL PASO	72.8	0.03	0.03	ND
VA:LYNCHBURG	135.3	0.33	0.07	ND
WA:SEATTLE	15.0	0.02	0.01	ND
WI:MADISON	67.5	0.08	0.03	ND

ND NO GAMMA ACTIVITY DETECTABLE
s SIGMA COUNTING ERROR

TABLE 7

GROSS BETA CONCENTRATION IN PRECIPITATION

SEPTEMBER 1984

LOCATION	DEPTH (mm)	ACT. ± 2s (nCi/m^2)		SPECIFIC GAMMA ACT. (pCi/l)
AL:MONTGOMERY	18.7	0.02	0.01	ND
AR:LITTLE ROCK	18.9	0.02	0.01	ND
CT:HARTFORD	15.0	0.04	0.01	ND
DC:WASHINGTON	15.6	0.00	0.01	ND
DE:WILMINGTON	85.0	0.22	0.05	ND
FL:JACKSONVILLE	73.3	0.06	0.03	ND
FL:MIAMI	132.5	0.09	0.06	ND
ID:BOISE	44.8	0.03	0.02	ND
ID:IDAHO FALLS	32.3	0.03	0.01	ND
IL:CHICAGO	7.3	0.01	0.00	ND
IN:INDIANAPOLIS	46.3	0.00	0.02	ND
MI:LANSING	67.0	0.15	0.04	ND
MN:MINNEAPOLIS	115.3	0.10	0.05	ND
ND:BISMARCK	24.1	0.07	0.01	ND
NH:CONCORD	24.0	0.07	0.02	ND
NJ:TRENTON	69.3	0.30	0.05	ND
NV:LAS VEGAS	25.0	0.02	0.01	ND
NY:ALBANY	63.9	0.16	0.04	ND
NY:NEW YORK CITY	33.6	0.10	0.02	ND
NY:NIAGARA FALLS	156.1	0.31	0.10	ND
NY:YAPHANK	82.5	0.14	0.05	ND
OH:COLUMBUS	46.8	0.03	0.02	ND
OH:PAINESVILLE	198.1	0.22	0.09	ND
OH:TOLEDO	65.0	0.08	0.03	ND
OR:PORTLAND	40.0	0.04	0.02	ND
PA:HARRISBURG	32.5	0.14	0.02	^{214}Bi 114 ± 82%
SC:BARNWELL	8.7	0.02	0.01	ND
TN:KNOXVILLE	10.0	0.02	0.00	ND
TX:AUSTIN	10.0	0.01	0.01	ND
VA:LYNCHBURG	119.0	0.37	0.08	ND
VA:VIRGINIA BEACH	25.0	0.09	0.02	ND
WA:SEATTLE	32.5	0.04	0.02	ND
WI:MADISON	85.2	0.08	0.04	ND

ND NO GAMMA ACTIVITY DETECTABLE
s SIGMA COUNTING ERROR

TABLE 8

PRECIPITATION
TRITIUM CONCENTRATION

JULY- SEPTEMBER 1984

LOCATION	JULY nCi/l ± 2s	AUGUST nCi/l ± 2s	SEPTEMBER nCi/l ± 2s
AL:MONTGOMERY	0.2 0.2	0.2 0.2	0.2 0.2
AR:LITTLE ROCK	NS	NS	0.3 0.2
CO:DENVER	0.2 0.2	0.3 0.2	NS
CT:HARTFORD	0.2 0.2	0.2 0.2	0.3 0.2
DC:WASHINGTON	0.2 0.2	NS	0.5 0.2
DE:WILMINGTON	0.2 0.2	0.2 0.2	0.2 0.2
FL:JACKSONVILLE	0.1 0.2	NS	0.3 0.2
FL:MIAMI	0.1 0.2	0.1 0.2	0.2 0.2
GA:ATLANTA	0.2 0.2	NS	NS
ID:BOISE	0.2 0.2	0.3 0.2	0.3 0.2
ID:IDAHO FALLS	0.2 0.2	0.2 0.2	0.4 0.2
IL:CHICAGO	0.3 0.2	0.2 0.2	0.2 0.2
IN:INDIANAPOLIS	0.3 0.2	0.2 0.2	0.4 0.2
MI:LANSING	0.2 0.2	0.2 0.2	0.3 0.2
MN:MINNEAPOLIS	0.4 0.2	0.3 0.2	0.1 0.2
MS:JACKSON	0.2 0.2	0.1 0.2	NS
ND:BISMARCK	0.2 0.2	NS	0.2 0.2
NH:CONCORD	0.1 0.2	0.2 0.2	0.2 0.2
NJ:TRENTON	0.2 0.2	0.2 0.2	0.2 0.2
NV:LAS VEGAS	0.2 0.2	0.2 0.2	0.2 0.2
NY:ALBANY	0.2 0.2	0.2 0.2	0.2 0.2
NY:NEW YORK CITY	0.2 0.2	0.2 0.2	0.3 0.2
NY:NIAGARA FALLS	0.2 0.2	0.2 0.2	0.2 0.2
NY:YAPHANK	0.3 0.2	0.2 0.2	0.2 0.2
OH:COLUMBUS	0.3 0.2	0.4 0.2	0.3 0.2
OH:PAINESVILLE	0.2 0.2	0.3 0.2	0.3 0.2
OH:TOLEDO	NS	0.4 0.2	0.2 0.2
OR:PORTLAND	0.2 0.2	NS	0.3 0.2
PA:HARRISBURG	0.2 0.2	0.2 0.2	0.2 0.2
RI:PROVIDENCE	NS	0.1 0.2	NS
SC:BARNWELL	1.6 0.2	4.8 0.2	2.1 0.3
SC:COLUMBIA	1.3 0.2	0.8 0.2	NS
SD:PIERRE	0.2 0.2	0.3 0.2	NS
TN:KNOXVILLE	0.2 0.2	0.2 0.2	0.3 0.2

TABLE 8 (CONTINUED)

PRECIPITATION
TRITIUM CONCENTRATION

JULY- SEPTEMBER 1984

LOCATION	JULY nCi/l ± 2s	AUGUST nCi/l ± 2s	SEPTEMBER nCi/l ± 2s
TN:NASHVILLE	0.1 0.2	0.2 0.2	NS
TX:AUSTIN	0.3 0.2	0.2 0.2	0.2 0.2
TX:EL PASO	0.3 0.2	0.4 0.2	NS
VA:LYNCHBURG	0.4 0.2	0.1 0.2	0.4 0.2
VA:VIRGINIA BEACH	0.2 0.2	NS	0.4 0.2
WA:SEATTLE	0.2 0.2	0.2 0.2	0.3 0.2
WI:MADISON	0.2 0.2	0.0 0.2	0.2 0.2

NS NO SAMPLE
s SIGMA COUNTING ERROR

Plutonium and Uranium in Airborne Particulates

Environmental radiation levels of plutonium and uranium are determined by the analyses of quarterly composite samples (air filters) collected from the 67 continuously operating airborne particulate samplers.

Analyses of the composited filters consist of ashing, separating by liquid ion exchange, and coprecipitation of the plutonium or uranium.

Concentration of the specific isotopes of plutonium-238, -239, and uranium-234, -235, and -238 are determined by alpha spectroscopy. The volume of air passing through the filters normally ranges from 25,000 to 40,000 m^3 for each quarterly composite.

Plutonium and uranium in airborne particulates data will be published when available.

Krypton-85

Krypton-85 is a long-lived noble gas with a half life of 10.8 years. It is released into the atmosphere by nuclear reactor operations, fuel fabrication, fuel reprocessing, and nuclear detonations. Krypton-85 also occurs naturally in minor quantities primarily from the neutron capture of stable krypton-84 as well as spontaneous fission and neutron-induced fission of uranium. Monitoring of krypton-85 in the atmosphere has been conducted to identify and establish baseline levels and long-term trends.

Krypton-85 analysis began in January 1973 with sample collections and analyses being performed for 12 sampling locations. These locations were selected to provide atmospheric coverage of the United States with considerations being given to the proximity to fuel reprocessing plants, nuclear reactors, and wide geographic coverage.

Dry compressed air samples, collected at each location, are purchased from commercial air suppliers annually and shipped to the EERF where the krypton-85 is cryogenically separated and counted in a liquid scintillation system.

The Kr-85 results will be published when they are available.

ERAMS

SECTION II. Water Program

The ERAMS water program provides ambient radiation data to assess the effects of nuclear fallout, the natural radiation environment, and other nuclear sources on the nation's rivers, streams and drinking water supplies.

Surface Water

Grab samples are taken quarterly at 58 stations located downstream from operating or future nuclear facilities.

Surface water monitoring consists of tritium analyses quarterly and gamma scans annually. Tritium is the primary radioactive pollutant from nuclear power plants.

Tritium concentrations are determined by liquid scintillation counting of distilled samples. Gamma scans are performed annually to determine if there is a buildup of other contaminants.

Tritium concentrations for surface water samples for July + September 1984 are given in Table 9.

Results from the 1984 annual gamma analyses of surface water are shown in Table 9.1.

TABLE 9

SURFACE WATER
TRITIUM CONCENTRATION

JULY - SEPTEMBER 1984

LOCATION	SOURCE	DATE COLLECTED	nCi/l	± 2s
AL:DECATUR	TENNESSEE RIVER	7/12/84	0.2	0.2
AL:DOTHAN	CHATTAHOOCHEE R.	7/24/84	0.2	0.2
AL:SCOTTSBORO	TENNESSEE RIVER	7/10/84	0.2	0.2
AR:LITTLE ROCK	ARKANSAS RIVER	7/14/84	0.2	0.2
CA:DIABLO CANYON	PACIFIC OCEAN	7/23/84	0.2	0.2
CA:EUREKA	HUMBOLDT BAY	7/12/84	0.1	0.2
CA:SAN ONOFRE	PACIFIC OCEAN	7/30/84	0.2	0.2
CO:GREELEY	SOUTH PLATTE RIVER	7/10/84	0.2	0.2
CT:EAST HADDAM	CONNECTICUT RIVER	9/19/84	0.4	0.2
FL:CRYSTAL RIVER	GULF OF MEXICO	7/ 2/84	0.3	0.2
FL:FT. PIERCE	ATLANTIC OCEAN	7/ 3/84	0.1	0.2
FL:HOMESTEAD	BISCAYNE BAY	7/18/84	0.3	0.2
IA:CEDAR RAPIDS	CEDAR RIVER	7/24/84	0.3	0.2
ID:BUHL	SNAKE RIVER	7/ 4/84	0.1	0.2
IL:EAST MOLINE	MISSISSIPPI RIVER	8/15/84	0.2	0.2
IL:MORRIS	ILLINOIS RIVER	7/17/84	0.4	0.2
IL:OREGON	ROCK RIVER	7/31/84	0.3	0.2
IL:ZION	LAKE MICHIGAN	7/16/84	0.3	0.2
LA:NEW ORLEANS	MISSISSIPPI RIVER	7/ 9/84	0.2	0.2
MA:PLYMOUTH	CAPE CODE BAY	7/ 3/84	0.1	0.2
MA:ROWE	DEERFIELD RIVER	8/30/84	0.4	0.2
MD:CONOWINGO	SUSQUEHANNA RIVER	7/10/84	0.1	0.2
MD:LUSBY	CHESAPEAKE BAY	7/10/84	0.2	0.2
ME:WISCASSET	MONTSEWAY BAY	7/ 3/84	0.1	0.2
MI:BRIDGMAN	LAKE MICHIGAN	7/ 2/84	0.2	0.2
MI:CHARLEVOIX	LAKE MICHIGAN	7/ 6/84	0.3	0.2
MI:MONROE	LAKE ERIE	7/ 9/84	0.2	0.2
MI:SOUTH HAVEN	LAKE MICHIGAN	7/ 2/84	0.2	0.2
MN:MONTICELLO	MISSISSIPPI RIVER	7/ 8/84	0.1	0.2
MN:RED WING	MISSISSIPPI RIVER	7/11/84	0.2	0.2
MS:PORT GIBSON	MISSISSIPPI RIVER	7/17/84	0.3	0.2
NC:CHARLOTTE	CATAWBA RIVER	7/ 9/84	0.3	0.2
NC:SOUTHPORT	ATLANTIC OCEAN	7/11/84	0.1	0.2
NE:RULO	MISSOURI RIVER	7/ 3/84	0.2	0.2
NJ:BAYSIDE	DELAWARE RIVER	7/26/84	0.2	0.2
NJ:OYSTER CREEK	OYSTER CREEK	7/ 1/84	0.2	0.2

TABLE 9 (CONTINUED)

SURFACE WATER
TRITIUM CONCENTRATION

JULY - SEPTEMBER 1984

LOCATION	SOURCE	DATE COLLECTED	nCi/l	± 2s
NV:BOULDER CITY	COLORADO RIVER	7/10/84	0.3	0.2
NY:OSSINING	HUDSON RIVER	7/17/84	0.2	0.2
NY:OSWEGO	LAKE ONTARIO	7/15/84	0.3	0.2
NY:POUGHKEEPSIE	HUDSON RIVER	7/ 5/84	0.3	0.2
OH:TOLEDO	LAKE ERIE	7/ 3/84	0.2	0.2
OR:BRADWOOD	COLUMBIA RIVER	7/ 5/84	0.2	0.2
PA:DANVILLE	SUSQUEHANNA RIVER	7/11/84	0.2	0.2
SC:ALLENDALE	SAVANNAH RIVER	7/30/84	0.3	0.2
SC:BROAD RIVER	BROAD RIVER	7/23/84	0.6	0.2
SC:HARTSVILLE	LAKE ROBINSON	7/ 9/84	0.2	0.2
TN:DAISY	TENNESSEE RIVER	8/21/84	0.4	0.2
TN:KINGSTON	CLINCH RIVER	7/10/84	1.2	0.2
TX:EL PASO	RIO GRANDE	7/19/84	0.2	0.2
TX:MATAGORDA	COLORADO RIVER	8/16/84	0.2	0.2
VA:DOSWELL	NORTH ANNA RIVER	7/ 5/84	1.7	0.2
WA:NORTHPORT	COLUMBIA RIVER	7/10/84	0.2	0.2
WA:RICHLAND	COLUMBIA RIVER	7/10/84	0.2	0.2
WI:TWO CREEKS	LAKE MICHIGAN	7/23/84	0.2	0.2
WI:VICTORY	MISSISSIPPI RIVER	7/ 9/84	0.2	0.2
WV:WHEELING	OHIO RIVER	7/18/84	0.4	0.2

s SIGMA COUNTING ERROR

TABLE 9.1

SURFACE WATER
ANNUAL GAMMA ANALYSIS

1984

LOCATION	SOURCE	DATE COLLECTED	GAMMA pCi/l ± 2s
AL:DOTHAN	CHATTAHOOCHEE R.	4/20/84	ND
AL:SCOTTSBORO	TENNESSEE RIVER	4/ 3/84	ND
CA:DIABLO CANYON	PACIFIC OCEAN	4/27/84	ND
CA:EUREKA	HUMBOLDT BAY	4/19/84	^{40}K 282 ± 30%
CA:SAN ONOFRE	PACIFIC OCEAN	4/26/84	^{40}K 254 ± 69%
CO:GREELEY	SOUTH PLATTE RIVER	4/16/84	ND
CT:EAST HADDAM	CONNECTICUT RIVER	5/ 2/84	ND
CT:WATERFORD	CONNECTICUT RIVER	5/ 3/84	^{40}K 233 ± 36%
FL:CRYSTAL RIVER	GULF OF MEXICO	4/ 9/84	ND
FL:FT. PIERCE	ATLANTIC OCEAN	4/10/84	ND
FL:HOMESTEAD	BISCAYNE BAY	4/20/84	ND
IA:CEDAR RAPIDS	CEDAR RIVER	4/17/84	ND
ID:BUHL	SNAKE RIVER	4/20/84	ND
IL:EAST MOLINE	MISSISSIPPI RIVER	5/29/84	ND
IL:MORRIS	ILLINOIS RIVER	4/ 7/84	ND
IL:OREGON	ROCK RIVER	4/15/84	ND
IL:ZION	LAKE MICHIGAN	4/ 3/84	ND
LA:NEW ORLEANS	MISSISSIPPI RIVER	4/16/84	ND
MA:PLYMOUTH	CAPE CODE BAY	4/ 3/84	ND
MA:ROWE	DEERFIELD RIVER	4/24/84	ND
MD:CONOWINGO	SUSQUEHANNA RIVER	4/11/84	ND
MD:LUSBY	CHESAPEAKE BAY	4/10/84	ND
ME:WISCASSET	MONTSEWAY BAY	4/10/84	^{40}K 120 ± 68%
MI:BRIDGMAN	LAKE MICHIGAN	4/ 3/84	ND
MI:CHARLEVOIX	LAKE MICHIGAN	4/14/84	ND
MI:MONROE	LAKE ERIE	4/16/84	ND
MI:SOUTH HAVEN	LAKE MICHIGAN	4/ 2/84	ND
MN:MONTICELLO	MISSISSIPPI RIVER	4/ 3/84	ND
MN:RED WING	MISSISSIPPI RIVER	4/10/84	ND
MS:PORT GIBSON	MISSISSIPPI RIVER	5/17/84	ND
NC:CHARLOTTE	CATAWBA RIVER	4/ 9/84	ND
NC:SOUTHPORT	ATLANTIC OCEAN	4/ 3/84	ND
NE:RULO	MISSOURI RIVER	4/11/84	ND
NJ:OYSTER CREEK	OYSTER CREEK	7/ 1/84	ND
NV:BOULDER CITY	COLORADO RIVER	4/ 9/84	ND
NY:OSSINING	HUDSON RIVER	4/12/84	ND
NY:OSWEGO	LAKE ONTARIO	4/15/84	ND

TABLE 9.1 (CONTINUED)

SURFACE WATER
ANNUAL GAMMA ANALYSIS

1984

LOCATION	SOURCE	DATE COLLECTED	GAMMA pCi/l ± 2s
NY:POUGHKEEPSIE	HUDSON RIVER	4/ 4/84	ND
OH:TOLEDO	LAKE ERIE	4/ 3/84	ND
OR:BRADWOOD	COLUMBIA RIVER	4/12/84	ND
PA:DANVILLE	SUSQUEHANNA RIVER	4/11/84	ND
SC:ALLENDALE	SAVANNAH RIVER	3/30/84	ND
SC:BROAD RIVER	BROAD RIVER	4/23/84	ND
SC:HARTSVILLE	LAKE ROBINSON	4/ 9/84	ND
TN:DAISY	TENNESSEE RIVER	5/30/84	ND
TN:KINGSTON	CLINCH RIVER	4/ 3/84	ND
TX:EL PASO	RIO GRANDE	4/23/84	ND
TX:MATAGORDA	COLORADO RIVER	3/28/84	ND
VA:DOSWELL	NORTH ANNA RIVER	4/ 5/84	ND
WA:NORTHPORT	COLUMBIA RIVER	5/ 8/84	ND
WA:RICHLAND	COLUMBIA RIVER	4/13/84	ND
WI:TWO CREEKS	LAKE MICHIGAN	4/13/84	ND
WI:VICTORY	MISSISSIPPI RIVER	4/ 9/84	ND
WV:WHEELING	OHIO RIVER	4/11/84	ND

ND NO GAMMA ACTIVITY DETECTABLE
s SIGMA COUNTING ERROR

Drinking Water

The drinking water program provides ambient radiation monitoring relevant to the effects of the nuclear power industry, natural environmental levels, and other pertinent sources. These data serve to assess trends and anomalies in concentrations, and to compare with standards set forth in the EPA "National Interim Primary Drinking Water Regulations." These regulations provide for approval of supplies when the combined radium-226 and radium-228 levels do not exceed 5 pCi/l, when the gross alpha (excluding radon and uranium) levels do not exceed 15 pCi/l, when tritium levels do not exceed 20,000 pCi/l, when the strontium-90 levels do not exceed 8 pCi/l, and when the gross beta levels do not exceed 50 pCi/l.

Grab samples are taken at 78 sites which are either major population centers or selected nuclear facility environs.

The analyses include (a) tritium on a quarterly basis; (b) gross alpha, gross beta, strontium-90, and gamma on annual composites; (c) radium-226 if the gross alpha exceeds 2 pCi/l and radium-228 if the radium-226 falls between 3 and 5 pCi/l; (d) specific iodine-131 on one quarterly sample per year for each station; and (e) an annual composite for plutonium-238 and -239 and uranium-234, -235, and -238 for stations that demonstrate gross alpha levels greater than 2 pCi/l.

Tritium analyses are performed by scintillation counting of the distilled samples, gross beta, and gross alpha by evaporating an aliquot on stainless steel planchets for counting, and radium-226 by the standard emanation technique. Strontium-90 is determined by beta counting a strontium carbonate precipitate isolated by ion exchange.

The results of tritium in drinking water analyses for July - September 1984 are shown in Table 10.

The annual alpha, beta, gamma, radium, and strontium analyses for 1983 annual drinking water samples are shown in Table 11.

All samples were taken as either a single grab sample or composite samples taken over 12 to 14 days.

TABLE 10

DRINKING WATER
TRITIUM CONCENTRATION

JULY - SEPTEMBER 1984

LOCATION	DATE COLLECTED	nCi/l	± 2s
AK:FAIRBANKS	7/12/84	0.1	0.2
AL:DOTHAN	7/24/84	0.2	0.2
AL:MONTGOMERY	7/13/84	0.1	0.2
AL:MUSCLE SHOALS	7/11/84	0.1	0.2
AL:SCOTTSBORO	7/10/84	0.1	0.2
AR:LITTLE ROCK	7/ 3/84	0.3	0.2
CA:BERKELEY	7/10/84	0.3	0.2
CA:LOS ANGELES	7/ 5/84	0.2	0.2
CO:DENVER	8/20/84	0.4	0.2
CO:PLATTEVILLE	8/20/84	0.2	0.2
CT:HARTFORD	7/ 5/84	0.3	0.2
DE:DOVER	7/ 3/84	0.1	0.2
FL:MIAMI	7/ 3/84	0.2	0.2
FL:TAMPA	7/16/84	0.2	0.2
GA:SAVANNAH	7/ 2/84	2.3	0.2
HI:HONOLULU	7/24/84	0.2	0.2
IA:CEDAR RAPIDS	7/24/84	0.2	0.2
ID:IDAHO FALLS	7/13/84	0.5	0.2
IL:MORRIS	7/ 3/84	0.3	0.2
IL:W. CHICAGO	7/ 2/84	0.1	0.2
KS:TOPEKA	7/ 2/84	0.3	0.2
LA:NEW ORLEANS	7/23/84	0.2	0.2
MA:LAWRENCE	8/ 1/84	0.2	0.2
MD:BALTIMORE	7/ 3/84	0.2	0.2
MD:CONOWINGO	7/10/84	0.2	0.2
ME:AUGUSTA	7/ 3/84	0.2	0.2
MI:DETROIT	7/ 9/84	0.3	0.2
MI:GRAND RAPIDS	7/17/84	0.2	0.2
MN:MINNEAPOLIS	7/16/84	0.2	0.2
MN:RED WING	7/11/84	0.2	0.2
MS:JACKSON	7/ 5/84	0.1	0.2
MS:PORT GIBSON	7/10/84	0.1	0.2
MT:HELENA	7/17/84	0.3	0.2
NC:CHARLOTTE	7/ 9/84	0.3	0.2
NC:WILMINGTON	7/12/84	0.3	0.2
ND:BISMARCK	7/ 3/84	0.3	0.2
NE:LINCOLN	7/10/84	0.2	0.2
NH:CONCORD	7/ 2/84	0.1	0.2

TABLE 10 (CONTINUED)

DRINKING WATER
TRITIUM CONCENTRATION

JULY - SEPTEMBER 1984

LOCATION	DATE COLLECTED	nCi/l	± 2s
NM:SANTA FE	7/ 2/84	0.2	0.2
NV:LAS VEGAS	7/ 3/84	0.3	0.2
NY:ALBANY	7/ 3/84	0.3	0.2
NY:NEW YORK CITY	7/11/84	0.4	0.2
NY:NIAGARA FALLS	7/ 2/84	0.3	0.2
NY:SYRACUSE	7/17/84	0.2	0.2
OH:CINCINNATI	7/ 2/84	0.1	0.2
OH:COLUMBUS	7/11/84	0.2	0.2
OH:EAST LIVERPOOL	7/11/84	0.2	0.2
OH:PAINESVILLE	7/ 6/84	0.1	0.2
OH:TOLEDO	7/ 3/84	0.4	0.2
OK:OKLAHOMA CITY	7/ 9/84	0.1	0.2
OR:PORTLAND	7/ 2/84	0.2	0.2
PA:COLUMBIA	7/ 5/84	0.2	0.2
PA:HARRISBURG	7/11/84	0.2	0.2
PA:PITTSBURGH	7/ 3/84	0.2	0.2
PC:ANCON	7/24/84	0.2	0.2
RI:PROVIDENCE	7/ 2/84	0.1	0.2
SC:BARNWELL	7/23/84	0.3	0.2
SC:COLUMBIA	7/ 3/84	0.6	0.2
SC:HARTSVILLE	7/23/84	0.2	0.2
SC:JENKINSVILLE	7/23/84	0.3	0.2
SC:SENECA	7/11/84	0.4	0.2
TN:CHATTANOOGA	7/ 3/84	0.4	0.2
TN:KNOXVILLE	7/ 2/84	0.2	0.2
TX:AUSTIN	7/ 5/84	0.1	0.2
VA:DOSWELL	8/ 1/84	0.2	0.2
VA:LYNCHBURG	7/ 3/84	0.3	0.2
VA:VIRGINIA BEACH	7/10/84	0.1	0.2
VI:ST. THOMAS	7/18/84	0.1	0.2
WA:RICHLAND	7/10/84	0.2	0.2
WA:SEATTLE	7/ 3/84	0.1	0.2
WI:GENOA CITY	7/ 9/84	0.2	0.2
WI:MADISON	7/11/84	0.4	0.2

s SIGMA COUNTING ERROR

TABLE 11

DRINKING WATER
ALPHA, BETA AND GAMMA CONCENTRATION

1983

ANNUAL ANALYSES

LOCATION	TOTAL SOLIDS mg/l	GROSS BETA DATE CTD. pCi/l ± 2s	GROSS ALPHA DATE CTD. pCi/l ± 2s	^{90}Sr pCi/l ± 2s	^{226}Ra pCi/l ± 2s	SPECIFIC GAMMA ACTIVITY
AK:FAIRBANKS	205.0	2.2 1.3	0.1 0.9 1/30/84	0.0 0.3 1/30/84	NA	ND
AL:DOTHAN	131.2	1.1 0.9	0.1 0.5 1/30/84	0.1 0.3 1/30/84	NA	ND
AL:MONTGOMERY	98.2	1.0 0.8	0.3 0.4 1/30/84	0.3 0.2 1/30/84	NA	ND
AL:MUSCLE SHOALS	124.6	1.8 0.9	0.4 0.5 1/30/84	0.3 0.2 1/30/84	NA	ND
AL:SCOTTSBORO	119.6	1.3 1.0	0.2 0.4 1/30/84	0.3 0.3 1/30/84	NA	ND
CA:BERKELEY	102.4	1.1 0.9	0.3 0.5 1/30/84	0.2 0.1 1/30/84	NA	ND
CA:LOS ANGELES	374.0	7.0 2.4	15.3 3.3 1/30/84	0.1 0.1 1/30/84	0.1 0.1	ND
CO:DENVER	101.8	2.1 0.8	2.0 0.7 1/30/84	0.2 0.2 1/30/84	0.1 0.1	ND
CO:PLATTEVILLE	907.1	7.6 4.7	12.0 5.2 1/30/84	0.1 0.1 1/30/84	0.2 0.1	ND
CT:HARTFORD	36.8	0.7 0.7	0.0 0.3 1/30/84	0.3 0.2 1/30/84	NA	ND
DC:WASHINGTON	202.3	2.1 1.4	0.4 0.9 2/29/84	0.1 0.1 2/29/84	NA	ND
DE:DOVER	219.3	2.9 1.8	0.0 0.0 1/30/84	0.0 0.1 1/30/84	NA	ND

TABLE 11 (CONTINUED)

DRINKING WATER
ALPHA, BETA AND GAMMA CONCENTRATION

1983

ANNUAL ANALYSES

LOCATION	TOTAL SOLIDS mg/1	GROSS BETA DATE CTD. pCi/1 ± 2s	GROSS ALPHA DATE CTD. pCi/1 ± 2s	^{90}Sr pCi/1 ± 2s	^{226}Ra pCi/1 ± 2s	SPECIFIC GAMMA ACTIVITY
FL:MIAMI	200.8	1.9 1.0	0.9 0.9 1/30/84	0.1 0.2 1/30/84	NA	ND
FL:TAMPA	187.3	2.2 1.1	0.4 0.8 2/ 7/84	0.2 0.5 2/ 7/84	NA	ND
GA:SAVANNAH	75.4	2.3 0.9	0.4 0.3 2/ 7/84	0.2 0.2 2/ 7/84	NA	ND
HI:HONOLULU	191.0	1.3 1.0	0.5 0.7 2/ 7/84	0.2 0.1 2/ 7/84	NA	ND
IA:CEDAR RAPIDS	183.5	2.0 1.0	1.2 0.8 2/ 7/84	+0.3 0.1 2/ 7/84	NA	ND
ID:BOISE	69.4	1.0 0.8	0.3 0.3 2/ 7/84	+0.1 0.1 2/ 7/84	NA	ND
ID:IDAHO FALLS	290.0	22.4 3.3	41.7 4.7 2/ 7/84	+0.1 0.3 2/17/84	0.0 0.1	ND
IL:MORRIS	349.0	17.1 3.7	26.5 4.5 2/ 7/84	0.1 0.0 2/ 7/84	6.3 0.1	ND
IL:W. CHICAGO	358.0	20.8 4.5	18.2 3.8 2/ 7/84	0.0 0.1 2/ 7/84	4.2 0.1	ND
KS:TOPEKA	341.0	6.0 3.6	2.0 1.6 2/ 7/84	0.3 0.1 2/ 7/84	0.1 0.1	ND
LA:NEW ORLEANS	173.3	2.9 1.4	1.0 0.9 2/ 7/84	0.0 0.1 2/ 7/84	NA	ND
MA:LAWRENCE	108.6	2.2 0.9	0.4 0.5 2/ 7/84	0.4 0.1 2/ 7/84	NA	ND

TABLE 11 (CONTINUED)

DRINKING WATER
ALPHA, BETA AND GAMMA CONCENTRATION

1983

ANNUAL ANALYSES

LOCATION	TOTAL SOLIDS mg/l	GROSS BETA DATE CTD. pCi/l ± 2s	GROSS ALPHA DATE CTD. pCi/l ± 2s	^{90}Sr pCi/l ± 2s	^{226}Ra pCi/l ± 2s	SPECIFIC GAMMA ACTIVITY
MA:ROWE	50.2	1.6 0.8	0.2 0.3 2/ 7/84	-0.4 0.2 2/ 7/84	NA	ND
MD:BALTIMORE	111.2	2.6 1.0	0.1 0.4 2/ 7/84	-0.2 0.1 2/ 7/84	NA	ND
MD:CONOWINGO	212.3	3.7 1.7	1.2 0.9 2/ 7/84	0.0 0.1 2/ 7/84	NA	ND
ME:AUGUSTA	59.2	1.5 0.8	0.3 0.3 2/ 7/84	0.0 0.2 2/ 7/84	NA	ND
MI:DETROIT	120.0	2.1 0.9	0.4 0.5 2/ 7/84	0.7 0.2 2/ 7/84	NA	ND
MI:GRAND RAPIDS	157.3	2.1 1.2	0.7 0.6 2/ 7/84	0.5 0.3 2/ 7/84	NA	ND
MN:MINNEAPOLIS	109.2	2.8 0.9	0.3 0.4 2/ 7/84	-0.7 1.3 2/ 7/84	NA	ND
MN:RED WING	203.5	4.7 1.7	5.8 1.8 2/ 9/84	-0.1 0.2 2/ 9/84	2.0 0.1	ND
MS:JACKSON	88.6	1.9 0.9	0.2 0.3 2/ 9/84	0.2 0.2 2/ 9/84	NA	ND
MS:PORT GIBSON	341.0	2.8 1.5	5.4 2.1 2/ 9/84	-0.2 0.3 2/ 9/84	0.1 0.1	ND
MT:HELENA	154.4	3.6 1.1	1.6 0.8 2/ 9/84	0.1 0.2 2/ 9/84	NA	ND
NC:CHARLOTTE	54.6	1.3 1.0	0.1 0.2 2/ 9/84	0.5 0.2 2/ 9/84	NA	ND

TABLE 11 (CONTINUED)

DRINKING WATER
ALPHA, BETA AND GAMMA CONCENTRATION

1983

ANNUAL ANALYSES

LOCATION	TOTAL SOLIDS mg/l	GROSS BETA DATE CTD. pCi/l ± 2s	GROSS ALPHA DATE CTD. pCi/l ± 2s	^{90}Sr pCi/l ± 2s	^{226}Ra pCi/l ± 2s	SPECIFIC GAMMA ACTIVITY
NC:WILMINGTON	151.5	2.7 1.1	1.2 0.9 2/ 9/84	0.0 0.5 2/ 9/84	NA	ND
ND:BISMARCK	337.0	5.6 2.1	5.1 2.0 2/ 9/84	-0.3 0.9 2/ 9/84	0.1 0.1	ND
NE:LINCOLN	364.0	8.5 2.4	6.3 2.3 2/ 9/84	0.1 0.2 2/ 9/84	0.3 0.1	ND
NH:CONCORD	70.0	1.2 0.7	0.2 0.3 2/ 9/84	-0.2 0.1 2/ 9/84	NA	ND
NJ:TRENTON	123.0	1.9 0.9	0.3 0.6 2/ 9/84	0.3 0.2 2/ 9/84	NA	ND
NJ:WARETOWN	48.0	2.3 0.8	0.9 0.4 2/ 9/84	0.2 0.1 2/ 9/84	NA	ND
NM:SANTA FE	148.4	1.6 0.8	0.9 0.7 2/ 9/84	-0.7 0.7 2/ 9/84	NA	ND
NV:LAS VEGAS	697.0	8.5 3.8	11.3 4.2 2/ 9/84	0.3 0.4 2/ 9/84	0.1 0.1	ND
NY:ALBANY	92.8	1.9 1.0	0.2 0.3 2/ 9/84	0.3 0.5 2/ 9/84	NA	ND
NY:NEW YORK CITY	43.2	1.1 0.7	0.3 0.4 2/ 9/84	-0.2 0.5 2/ 9/84	NA	ND
NY:NIAGARA FALLS	175.0	2.7 1.2	0.4 0.6 2/ 9/84	0.5 0.4 2/ 9/84	NA	ND
NY:SYRACUSE	136.4	2.5 0.9	0.5 0.6 2/ 9/84	0.4 0.5 2/ 9/84	NA	ND

TABLE 11 (CONTINUED)

DRINKING WATER
ALPHA, BETA AND GAMMA CONCENTRATION

1983

ANNUAL ANALYSES

LOCATION	TOTAL SOLIDS mg/l	GROSS BETA DATE CTD. pCi/l ± 2s	GROSS ALPHA DATE CTD. pCi/l ± 2s	^{90}Sr pCi/l ± 2s	^{226}Ra pCi/l ± 2s	SPECIFIC GAMMA ACTIVITY
OH:CINCINNATI	216.3	1.8 1.3	0.9 0.9 2/ 9/84	0.0 0.4 2/ 9/84	NA	ND
OH:COLUMBUS	284.5	6.2 2.1	8.7 2.3 2/ 9/84	0.2 0.2 2/ 9/84	0.1 0.1	ND
OH:EAST LIVERPOOL	252.7	3.0 1.4	0.8 0.9 2/ 9/84	0.0 0.5 2/ 9/84	NA	ND
OH:PAINESVILLE	200.3	2.9 1.2	-0.2 0.8 2/13/84	0.1 0.6 2/13/84	NA	ND
OH:TOLEDO	120.2	1.7 0.9	0.1 0.4 2/13/84	0.2 0.3 2/13/84	NA	ND
OK:OKLAHOMA CITY	86.4	2.7 1.0	0.1 0.4 2/13/84	0.3 0.4 2/13/84	NA	ND
OR:PORTLAND	22.6	0.9 0.8	0.0 0.2 2/13/84	-0.3 0.2 2/13/84	NA	ND
PA:COLUMBIA	200.8	2.0 1.3	0.2 0.6 2/13/84	0.4 0.2 2/13/84	NA	ND
PA:HARRISBURG	38.2	0.7 0.8	0.1 0.3 2/13/84	0.1 0.1 2/13/84	NA	ND
PA:PITTSBURGH	221.3	2.7 1.5	0.2 0.7 2/13/84	0.3 0.2 2/13/84	NA	ND
PC:ANCON	100.8	1.0 0.8	0.2 0.4 2/13/84	-0.1 0.1 2/13/84	NA	ND
RI:PROVIDENCE	68.6	1.3 0.9	0.2 0.3 2/13/84	-0.4 1.2 2/13/84	NA	ND

TABLE 11 (CONTINUED)

DRINKING WATER
ALPHA, BETA AND GAMMA CONCENTRATION

1983

ANNUAL ANALYSES

LOCATION	TOTAL SOLIDS mg/1	GROSS BETA DATE CTD. pCi/1 ± 2s	GROSS ALPHA DATE CTD. pCi/1 ± 2s	^{90}Sr pCi/1 ± 2s	^{226}Ra pCi/1 ± 2s	SPECIFIC GAMMA ACTIVITY
SC:BARNWELL	25.6	1.1 0.7	0.3 0.3 2/13/84	0.1 0.1 2/13/84	NA	ND
SC:COLUMBIA	65.8	1.9 0.9	0.2 0.3 2/13/84	0.2 0.2 2/13/84	NA	ND
SC:HARTSVILLE	36.2	0.6 0.6	0.3 0.3 2/13/84	-0.3 0.1 2/13/84	NA	ND
SC:JENKINSVILLE	186.2	4.4 0.5	44.4 3.5 2/13/84	-0.2 0.4 2/13/84	1.5 0.1	ND
SC:SENECA	32.0	0.4 0.8	0.1 0.2 2/13/84	0.1 0.2 2/13/84	NA	ND
TN:CHATTANOOGA	114.6	3.0 1.0	0.2 0.4 2/29/84	0.1 0.1 2/29/84	NA	ND
TN:KNOXVILLE	140.0	1.3 0.6	2.1 0.8 2/13/84	-0.1 0.5 2/13/84	0.0 0.1	ND
TX:AUSTIN	227.0	3.4 1.6	0.5 1.1 2/14/84	-0.7 0.8 2/14/84	NA	ND
VA:DOSWELL	174.6	5.6 1.3	0.4 0.6 2/14/84	-0.5 0.6 2/14/84	NA	ND
VA:LYNCHBURG	71.2	1.6 0.9	0.2 0.3 2/14/84	0.3 0.1 2/14/84	NA	ND
VA:VIRGINIA BEACH	113.2	2.5 0.9	0.1 0.4 2/14/84	0.5 0.2 2/14/84	NA	ND
VI:ST. THOMAS	56.4	1.6 0.8	0.2 0.3 2/29/84	-0.6 1.1 2/29/84	NA	ND

TABLE 11 (CONTINUED)

DRINKING WATER
ALPHA, BETA AND GAMMA CONCENTRATION

1983

ANNUAL ANALYSES

LOCATION	TOTAL SOLIDS mg/l	GROSS BETA DATE CTD. pCi/l ± 2s	GROSS ALPHA DATE CTD. pCi/l ± 2s	^{90}Sr pCi/l ± 2s	^{226}Ra pCi/l ± 2s	SPECIFIC GAMMA ACTIVITY
WA:RICHLAND	80.2	1.5 0.8	0.4 0.5 2/14/84	0.2 0.1 2/14/84	NA	ND
WA:SEATTLE	40.0	0.6 0.8	0.1 0.2 2/14/84	0.0 0.1 2/14/84	NA	ND
WI:GENOA CITY	186.7	1.6 1.2	0.8 0.8 2/14/84	0.0 0.3 2/14/84	NA	ND
WI:MADISON	215.7	1.0 1.0	1.6 1.0 2/14/84	0.4 0.2 2/14/84	0.4 0.1	ND

ND NO ACTIVITY DETECTABLE
NA NO ANALYSIS
s SIGMA COUNTING ERROR

SECTION III. External Gamma Ambient Monitoring Program

The external gamma monitoring program, which began in October 1978, provides a continuous measurement of ambient gamma exposure rates, including cosmic, at selected sites throughout the continental United States. Data from this program are used to evaluate fluctuations in natural background due to variations in environmental conditions and to provide a means of monitoring any significant increases in ambient gamma levels due to weapons fallout, reactor operations, etc. The program consists of approximately 22 sites representing a wide geographic coverage throughout the country.* Although exposure measurements at these few sites are not totally representative of nationwide exposures, they will be indicative of national trends.

The monitoring program utilizes CaF_2:Mn thermoluminescent dosimeters(TLD's). These dosimeters are commercially available glass-bulb type dosimeters with energy compensating shields. A group of three TLD's is located at each station or site. Dosimeters are annealed by the station operator prior to positioning in the field. The dosimeters are returned to EERF for readout on an approximate one-month cycle.** Several dosimeters are annealed by the station operator as controls and returned with the exposed field dosimeters to correct for any exposures accumulated during shipment.

Results from the period July - September 1984 are shown in Table 12.

* Some of these sites may not return dosimeters each period and consequently the number of sites listed may vary slightly.

** Starting October, 1984, this program will change to a quarterly cycle.

TABLE 12

ENVIRONMENTAL GAMMA AMBIENT MONITORING PROGRAM

LOCATION	DATE RANGE	INTEGRATED EXPOSURE	EXPOSURE RATE	
		MR	MICRO R/HR ± 2 s *	
AL:MONTGOMERY	70284- 80284	5.7	7.6	6.2
AL:MONTGOMERY	80284- 90484	6.1	7.7	7.1
AL:MONTGOMERY	90484-100184	5.9	9.1	6.0
CA:BERKELEY	70584- 80184	4.5	6.9	5.3
CA:BERKELEY	80184- 90584	5.7	6.8	4.4
CA:BERKELEY	90584-100384	4.7	7.0	6.3
CO:DENVER	62984- 80784	13.3	14.2	4.4
CO:DENVER	80784- 90584	9.8	14.1	6.5
CO:DENVER	90584-100284	10.4	16.1	6.9
FL:ORLANDO	70384- 90484	10.3	6.8	4.0
FL:ORLANDO	90484-100184	5.2	8.0	5.6
ID:BOISE	70984- 80984	9.1	12.2	25.2
ID:BOISE	80984- 90684	8.0	11.9	7.9
IL:CHICAGO	70684- 81484	7.9	8.4	10.1
IL:CHICAGO	81484- 90784	5.0	8.6	5.4
ND:BISMARCK	70584- 80184	8.1	12.5	6.5
ND:BISMARCK	80184- 90784	9.1	10.2	6.8
ND:BISMARCK	90784-100384	6.7	10.8	7.7
NJ:TRENTON	100383- 80184	81.4	11.2	2.5
NJ:TRENTON	80184- 90784	10.6	11.9	12.0
NM:SANTA FE	70984- 80284	9.0	15.6	9.2
NM:SANTA FE	80284- 91084	13.8	14.7	7.4
NM:SANTA FE	91084-100484	9.0	15.6	3.8
NV:LAS VEGAS	70284- 73184	5.7	8.3	9.8
NV:LAS VEGAS	73184- 90484	6.0	7.1	6.5
NV:LAS VEGAS	90484-100384	5.3	7.6	6.6
NY:NEW YORK	71684- 81584	6.3	8.7	7.8
NY:NEW YORK	81584- 91284	6.3	9.4	7.4
OH:COLUMBUS	70384- 80284	6.2	8.7	3.5
OH:COLUMBUS	80284- 90484	6.3	8.0	9.0
OH:COLUMBUS	90484-100184	5.7	8.8	4.0
OK:OKLAHOMA CITY	71384- 82284	8.6	8.9	4.0
OK:OKLAHOMA CITY	82284- 91084	3.9	8.5	10.0
OR:PORTLAND	70984- 80384	5.4	9.1	8.0
OR:PORTLAND	80384-100284	13.5	9.4	7.7
PA:HARRISBURG	70284- 73184	4.9	7.0	8.4
PA:HARRISBURG	73184- 90584	6.6	7.6	7.6
PA:HARRISBURG	90584-100184	4.9	7.9	5.5
RI:PROVIDENCE	70584- 82084	12.9	11.7	7.5
RI:PROVIDENCE	82084- 90684	4.8	11.8	6.9
SC:BARNWELL	71984- 80984	4.3	8.6	5.6

TABLE 12 (CONTINUED)

ENVIRONMENTAL GAMMA AMBIENT MONITORING PROGRAM

LOCATION	DATE RANGE	INTEGRATED EXPOSURE	EXPOSURE RATE	
		MR	MICRO R/HR ± 2 s *	
SC:BARNWELL	80984- 91384	8.4	10.0	3.7
SC:COLUMBIA	62984- 73084	7.3	9.9	5.5
SC:COLUMBIA	73084- 90484	7.3	8.4	4.1
SC:COLUMBIA	90484-100284	6.8	10.1	16.2
TN:KNOXVILLE	70284- 80284	7.6	10.2	5.7
TN:KNOXVILLE	80284- 90784	9.0	10.4	4.9
TN:KNOXVILLE	90784-100484	7.1	10.9	4.4
VA:RICHMOND	70584- 80184	5.9	9.2	4.8
VA:RICHMOND	80184- 90584	7.9	9.4	7.6
VA:RICHMOND	90584-100484	6.5	9.4	8.5
VT:MONTPELIER	53184- 73184	12.0	8.2	5.8
VT:MONTPELIER	73184- 81084	2.1	8.9	5.9
VT:MONTPELIER	81084- 91784	8.8	9.7	6.7

* s = SIGMA ERROR (IN PERCENT)

SECTION IV. Milk Program

Pasteurized Milk

This is a cooperative program of the EPA, ORP and the Dairy and Lipid Products Branch, Milk Sanitation Section, Food and Drug Administration. Milk is a reliable indicator of the general population's intake of radionuclides since it is consumed by a large segment of the population and contains several of the biologically important contaminants resulting from environmental releases from nuclear activities. A primary function of this program is to obtain reliable monitoring data relative to current radionuclide concentrations and determine any long-term trends.

Monthly samples are collected at 65 sampling sites with one or more located in each state, Puerto Rico, and the Panama Canal. These are composite samples representing more than 80 percent of the milk consumed in a given population center.

These samples are analyzed for iodine-131, barium-140, cesium-137, and potassium. All 65 samples are analyzed annually in July for strontium-89, and strontium-90. Also, for the first month of the three quarters beginning January, April and October, 10 regional composite samples of milk made up from the states within each of EPA's 10 regions are analyzed for strontium-89 and strontium-90.

Iodine-131, barium-140, cesium-137 and potassium are determined by gamma spectral analysis. Strontium-89 and strontium-90 are determined by beta counting a total strontium precipitate which has been chemically separated by ion-exchange.

The values from the pasteurized milk samples for July - September 1984 are shown in Tables 13 - 15.

Strontium values from regional composite samples collected July - September 1984 are shown in Table 16.

TABLE 13

CONCENTRATIONS OF RADIONUCLIDES IN PASTEURIZED MILK

JULY 1984

LOCATION	DATE COLLECTED	K g/l±2s		^{137}Cs pCi/l±2s		^{140}Ba pCi/l±2s		^{131}I pCi/l±2s	
AL:MONTGOMERY	7/ 6/84	1.50	0.09	3	5	-1	6	2	5
AR:LITTLE ROCK	7/ 2/84	1.43	0.12	9	7	2	9	-4	7
AZ:PHOENIX	7/ 5/84	1.53	0.13	9	7	-7	9	0	7
CA:LOS ANGELES	7/12/84	1.69	0.13	4	7	-1	9	-2	7
CA:SACRAMENTO	7/ 2/84	1.63	0.09	-2	5	-4	6	2	5
CA:SAN FRANCISCO	7/ 3/84	1.62	0.13	1	7	-6	9	-1	7
CO:DENVER	7/ 2/84	1.66	0.13	2	7	-2	9	6	7
CO:DENVER	7/30/84	1.40	0.12	1	7	3	9	1	7
CT:HARTFORD	7/16/84	1.58	0.13	3	7	0	9	-4	7
DC:WASHINGTON	7/ 6/84	1.55	0.13	-1	7	1	9	1	7
FL:TAMPA	7/ 3/84	1.52	0.13	11	7	-4	9	1	7
GA:ATLANTA	7/ 2/84	1.55	0.13	4	7	-5	9	-1	7
HI:HONOLULU	7/30/84	1.57	0.09	+1	5	-4	6	1	5
HI:HONOLULU	7/ 1/84	1.63	0.13	-1	7	0	9	2	7
IA:DES MOINES	7/ 9/84	1.50	0.09	2	5	0	6	0	5
ID:IDAHO FALLS	7/19/84	1.78	0.25	8	18	-4	18	-2	14
IL:CHICAGO	7/10/84	1.42	0.12	-3	7	-3	9	0	7
IN:INDIANAPOLIS	7/ 2/84	1.52	0.13	1	7	1	9	2	7
KS:WICHITA	7/ 2/84	1.48	0.12	2	7	0	9	1	7
KY:LOUISVILLE	7/ 3/84	1.55	0.13	5	7	-2	9	-3	7
MA:BOSTON	7/10/84	1.50	0.13	5	7	4	9	5	7
MD:BALTIMORE	7/ 6/84	1.62	0.13	2	7	-1	9	2	7
ME:PORTLAND	7/ 3/84	1.54	0.13	9	7	-3	9	1	7
MI:DETROIT	7/ 5/84	1.54	0.09	0	5	1	6	0	5
MI:GRAND RAPIDS	7/ 2/84	1.49	0.12	7	7	-5	9	5	7
MN:MINNEAPOLIS	7/ 9/84	1.57	0.13	-1	7	-2	9	0	7
MN:ST PAUL	7/ 3/84	1.79	0.25	4	18	5	19	1	14
MO:KANSAS CITY	7/ 5/84	1.60	0.13	-2	7	-4	9	2	7
MO:ST LOUIS	7/13/84	1.58	0.13	-2	7	0	9	-2	7
MS:JACKSON	7/ 9/84	1.42	0.12	6	7	0	9	-6	7
MT:HELENA	7/10/84	1.62	0.13	-2	7	-1	9	0	7
NC:CHARLOTTE	7/ 2/84	1.71	0.24	8	18	2	19	-1	14
ND:MINOT	7/27/84	1.61	0.13	2	7	+7	9	2	7
NE:OMAHA	7/ 6/84	1.35	0.12	4	7	-4	9	-2	7
NH:MANCHESTER	7/ 2/84	1.63	0.13	0	7	-1	9	0	7
NJ:TRENTON	7/ 5/84	1.72	0.13	+4	7	-4	9	6	7
NV:LAS VEGAS	7/23/84	1.53	0.13	1	7	-2	9	6	7
NY:BUFFALO	7/10/84	1.64	0.13	-4	7	-2	9	2	7

TABLE 13 (CONTINUED)

CONCENTRATIONS OF RADIONUCLIDES IN PASTEURIZED MILK

JULY 1984

LOCATION	DATE COLLECTED	K g/l±2s	^{137}Cs pCi/l±2s		^{140}Ba pCi/l±2s		^{131}I pCi/l±2s	
NY:NEW YORK CITY	7/ 2/84	1.54 0.13	+1	7	6	9	-2	7
NY:SYRACUSE	7/ 2/84	1.48 0.12	7	7	-4	9	1	7
OH:CINCINNATI	7/ 9/84	1.45 0.12	2	7	1	9	1	7
OH:CLEVELAND	7/ 9/84	1.48 0.12	5	7	2	9	-3	7
OK:OKLAHOMA CITY	7/23/84	1.52 0.09	-1	5	1	6	+2	5
OR:PORTLAND	7/ 2/84	1.58 0.09	0	5	1	6	0	5
PA:PHILADELPHIA	7/ 2/84	1.63 0.13	5	7	-5	9	1	7
PA:PITTSBURGH	7/ 3/84	1.51 0.13	6	7	+4	9	+3	7
PC:CRISTOBAL	7/26/84	1.57 0.13	13	7	-6	9	0	7
PR:SAN JUAN	7/16/84	1.53 0.09	5	5	-4	6	-1	5
SC:CHARLESTON	7/12/84	1.82 0.25	6	18	-7	18	-2	14
SD:RAPID CITY	7/ 5/84	1.57 0.13	2	7	+1	9	-1	7
TN:CHATTANOOGA	7/ 2/84	1.52 0.13	1	7	+1	9	0	7
TN:MEMPHIS	7/25/84	1.44 0.12	+3	7	+2	9	+3	7
TX:AUSTIN	7/ 2/84	1.48 0.12	1	7	-5	9	6	7
UT:SALT LAKE CITY	7/ 2/84	1.47 0.12	0	7	3	9	0	7
VA:NORFOLK	7/19/84	1.50 0.08	5	5	+3	6	3	5
VT:BURLINGTON	7/ 5/84	1.61 0.09	-3	5	-7	6	3	5
WA:SEATTLE	7/ 2/84	1.60 0.13	2	7	2	9	+2	7
WA:SPOKANE	7/ 2/84	1.58 0.13	3	7	+4	9	1	7
WV:CHARLESTON	7/18/84	1.51 0.13	0	7	+6	9	+2	7
WY:LARAMIE	7/ 3/84	1.55 0.09	+1	5	+1	6	0	5

s SIGMA COUNTING ERROR

TABLE 14

CONCENTRATIONS OF RADIONUCLIDES IN PASTEURIZED MILK

AUGUST 1984

LOCATION	DATE COLLECTED	K g/l±2s	^{137}Cs pCi/l±2s		^{140}Ba pCi/l±2s		^{131}I pCi/l±2s	
AL:MONTGOMERY	8/13/84	1.53 0.13	4	7	-4	9	-1	7
AR:LITTLE ROCK	8/ 8/84	1.69 0.13	0	7	+1	9	2	7
AZ:PHOENIX	8/ 9/84	1.38 0.12	-4	7	4	9	1	7
CA:LOS ANGELES	8/21/84	1.61 0.13	0	7	+1	9	3	7
CA:SACRAMENTO	8/ 1/84	1.63 0.13	0	7	2	9	0	7
CA:SAN FRANCISCO	8/ 8/84	1.56 0.13	0	7	0	9	4	7
CO:DENVER	8/31/84	1.50 0.12	+3	7	-5	9	+2	7
CT:HARTFORD	8/ 8/84	1.57 0.09	2	5	+1	6	-2	5
FL:TAMPA	8/ 8/84	1.56 0.13	13	7	3	9	+1	7
GA:ATLANTA	8/ 6/84	1.60 0.13	5	7	-7	9	2	7
GA:ATLANTA	8/30/84	1.59 0.13	6	7	-1	9	+1	7
IA:DES MOINES	8/ 7/84	1.54 0.13	1	7	1	9	+2	7
ID:IDAHO FALLS	8/ 6/84	1.61 0.13	3	7	+3	9	4	7
IL:CHICAGO	8/ 6/84	1.70 0.13	2	7	+3	9	1	7
IN:INDIANAPOLIS	8/ 6/84	1.54 0.13	3	7	-2	9	+1	7
KS:WICHITA	8/ 7/84	1.55 0.09	+2	5	0	6	+2	5
KY:LOUISVILLE	8/ 7/84	1.59 0.13	0	7	-2	9	2	7
LA:NEW ORLEANS	8/10/84	1.50 0.09	3	5	-2	6	0	5
MA:BOSTON	8/ 7/84	1.56 0.13	4	7	-2	9	5	7
MD:BALTIMORE	8/ 3/84	1.50 0.12	-1	7	6	9	+1	7
ME:PORTLAND	8/ 8/84	1.53 0.13	8	7	+7	9	2	7
MI:DETROIT	8/ 9/84	1.55 0.13	3	7	+3	9	-3	7
MI:GRAND RAPIDS	8/ 6/84	1.54 0.13	1	7	+2	9	-4	7
MN:MINNEAPOLIS	8/ 6/84	1.51 0.13	1	7	+1	9	+1	7
MN:ST PAUL	8/ 6/84	1.67 0.24	10	18	+8	18	8	14
MO:KANSAS CITY	8/ 9/84	1.65 0.13	+2	7	+6	9	5	7
MO:ST LOUIS	8/ 8/84	1.57 0.13	1	7	2	9	4	7
MS:JACKSON	8/13/84	1.50 0.09	4	5	-5	6	2	5
MT:HELENA	8/10/84	1.49 0.12	+2	7	+3	9	1	7
NC:CHARLOTTE	8/ 6/84	1.54 0.24	8	18	+4	18	11	14
ND:MINOT	8/22/84	1.68 0.13	1	7	-4	9	0	7
NE:OMAHA	8/10/84	1.44 0.12	5	7	-3	9	2	7
NH:MANCHESTER	8/ 6/84	1.43 0.12	4	7	-6	9	+4	7
NJ:TRENTON	8/ 9/84	1.53 0.13	2	7	-6	9	1	7
NM:ALBUQUERQUE	8/ 6/84	1.58 0.13	-3	7	+8	9	4	7
NY:BUFFALO	8/14/84	1.49 0.12	4	7	0	9	-1	7
NY:NEW YORK CITY	8/ 6/84	1.55 0.09	+2	5	4	6	0	5
NY:SYRACUSE	8/ 6/84	1.55 0.13	0	7	+2	9	3	7

TABLE 14 (CONTINUED)

CONCENTRATIONS OF RADIONUCLIDES IN PASTEURIZED MILK

AUGUST 1984

LOCATION	DATE COLLECTED	K g/l±2s	^{137}Cs pCi/l±2s		^{140}Ba pCi/l±2s		^{131}I pCi/l±2s	
OH:CINCINNATI	8/ 6/84	1.54 0.13	2	7	0	9	-3	7
OH:CLEVELAND	8/ 7/84	1.65 0.09	2	5	-2	6	0	5
OK:OKLAHOMA CITY	8/ 6/84	1.57 0.13	0	7	0	9	-2	7
OR:PORTLAND	8/ 7/84	1.54 0.13	4	7	+1	9	1	7
PA:PHILADELPHIA	8/ 6/84	1.50 0.09	2	5	0	6	-2	5
PA:PITTSBURGH	8/ 8/84	1.51 0.12	-1	7	+5	9	5	7
PC:CRISTOBAL	8/30/84	1.49 0.12	13	7	-4	9	2	7
PR:SAN JUAN	8/23/84	1.49 0.12	+3	7	5	9	-3	7
SC:CHARLESTON	8/22/84	1.55 0.13	3	7	3	9	3	7
SD:RAPID CITY	8/ 9/84	1.76 0.17	9	13	0	13	1	10
TN:CHATTANOOGA	8/ 6/84	1.52 0.13	3	7	-4	9	-4	7
TN:KNOXVILLE	8/ 6/84	1.63 0.13	3	7	+2	9	3	7
TN:MEMPHIS	8/29/84	1.63 0.13	+3	7	+3	9	4	7
UT:SALT LAKE CITY	8/ 5/84	1.57 0.13	1	7	+10	9	2	7
VA:NORFOLK	8/10/84	1.65 0.13	4	7	-3	9	7	7
VT:BURLINGTON	8/ 8/84	1.64 0.13	0	7	+1	9	+3	7
WA:SEATTLE	8/ 1/84	1.56 0.09	3	5	+2	6	-1	5
WI:MILWAUKEE	8/31/84	1.72 0.13	3	7	-11	9	-3	7
WI:MILWAUKEE	8/ 1/84	1.59 0.13	-1	7	+3	9	+3	7
WV:CHARLESTON	8/22/84	1.47 0.12	2	7	-2	9	5	7
WY:LARAMIE	8/ 7/84	1.58 0.13	3	7	+4	9	+1	7

s SIGMA COUNTING ERROR

TABLE 15

CONCENTRATIONS OF RADIONUCLIDES IN PASTEURIZED MILK

SEPTEMBER 1984

LOCATION	DATE COLLECTED	K g/l±2s	^{137}Cs pCi/l±2s		^{140}Ba pCi/l±2s		^{131}I pCi/l±2s	
AK:PALMER	9/18/84	1.60 0.13	1	7	-5	9	6	7
AL:MONTGOMERY	9/ 7/84	1.64 0.13	4	7	-3	9	0	7
AR:LITTLE ROCK	9/10/84	1.57 0.13	4	7	3	9	2	7
AZ:PHOENIX	9/ 6/84	1.55 0.13	1	7	1	9	0	7
CA:LOS ANGELES	9/24/84	1.68 0.13	0	7	3	9	0	7
CA:SACRAMENTO	9/ 4/84	1.56 0.13	3	7	-3	9	1	7
CA:SAN FRANCISCO	9/11/84	1.58 0.09	3	5	-7	6	-2	5
CO:DENVER	9/27/84	1.42 0.12	1	7	-1	9	3	7
CT:HARTFORD	9/17/84	1.51 0.12	-2	7	-7	9	2	7
FL:TAMPA	9/11/84	1.53 0.13	11	7	-5	9	4	7
HI:HONOLULU	9/ 4/84	1.60 0.13	5	7	0	9	-1	7
IA:DES MOINES	9/10/84	1.56 0.13	-2	7	-1	9	0	7
ID:IDAHO FALLS	9/11/84	1.57 0.13	6	7	-4	9	0	7
IL:CHICAGO	9/10/84	1.54 0.13	1	7	1	9	7	7
IN:INDIANAPOLIS	9/ 6/84	1.54 0.13	2	7	0	9	-2	7
KS:WICHITA	9/10/84	1.58 0.13	-2	7	1	9	0	7
KY:LOUISVILLE	9/ 5/84	1.59 0.09	-1	5	0	6	1	5
LA:NEW ORLEANS	9/12/84	1.50 0.13	5	7	9	9	0	7
MA:BOSTON	9/11/84	1.46 0.12	5	7	-3	9	4	7
MD:BALTIMORE	9/ 7/84	1.54 0.13	4	7	-2	9	3	7
ME:PORTLAND	9/ 4/84	1.59 0.13	9	7	-5	9	-1	7
MI:GRAND RAPIDS	9/ 4/84	1.53 0.13	3	7	-5	9	0	7
MN:MINNEAPOLIS	9/10/84	1.57 0.09	4	5	-1	6	0	5
MN:ST PAUL	9/ 4/84	1.54 0.13	2	7	-1	9	-3	7
MO:KANSAS CITY	9/ 6/84	1.57 0.13	2	7	-1	9	6	7
MO:ST LOUIS	9/ 5/84	1.55 0.09	4	5	-1	6	-2	5
MS:JACKSON	9/ 5/84	1.54 0.13	4	7	-3	9	-1	7
MT:HELENA	9/10/84	1.52 0.13	2	7	-4	9	3	7
NC:CHARLOTTE	9/ 4/84	1.75 0.24	10	18	0	19	-3	14
ND:MINOT	9/20/84	1.56 0.09	1	5	0	6	1	5
NE:OMAHA	9/ 7/84	1.44 0.12	1	7	-3	9	2	7
NH:MANCHESTER	9/10/84	1.52 0.09	2	5	-2	6	4	5
NJ:TRENTON	9/ 6/84	1.56 0.13	2	7	-2	9	0	7
NM:ALBUQUERQUE	9/ 4/84	1.51 0.09	-2	5	0	6	2	5
NV:LAS VEGAS	9/10/84	1.57 0.13	1	7	1	9	2	7
NY:BUFFALO	9/10/84	1.69 0.13	2	7	1	9	0	7
NY:NEW YORK CITY	9/10/84	1.54 0.13	3	7	-1	9	2	7
NY:SYRACUSE	9/ 4/84	1.58 0.09	3	5	0	6	0	5

TABLE 15 (CONTINUED)

CONCENTRATIONS OF RADIONUCLIDES IN PASTEURIZED MILK

SEPTEMBER 1984

LOCATION	DATE COLLECTED	K g/l±2s	^{137}Cs pCi/l±2s		^{140}Ba pCi/l±2s		^{131}I pCi/l±2s	
OH:CINCINNATI	9/10/84	1.45 0.12	2	7	-4	9	2	7
OH:CLEVELAND	9/10/84	1.60 0.13	-4	7	6	9	5	7
OK:OKLAHOMA CITY	9/ 4/84	1.57 0.13	10	10	-2	11	2	8
OR:PORTLAND	9/ 4/84	1.44 0.08	0	5	-2	6	2	5
PA:PITTSBURGH	9/ 5/84	1.50 0.09	0	5	0	6	3	5
PC:CRISTOBAL	9/27/84	1.48 0.12	16	7	1	9	0	7
PR:SAN JUAN	9/28/84	1.71 0.24	16	18	-4	18	5	14
SD:RAPID CITY	9/ 6/84	1.60 0.13	1	7	5	9	-5	7
TN:CHATTANOOGA	9/ 4/84	1.43 0.12	6	7	0	9	-3	7
TN:KNOXVILLE	9/10/84	1.57 0.13	0	7	-3	9	2	7
TN:MEMPHIS	9/26/84	1.66 0.13	2	7	-7	9	5	7
TX:AUSTIN	9/18/84	1.51 0.12	-2	7	-1	9	4	7
UT:SALT LAKE CITY	9/ 9/84	1.54 0.13	2	7	-5	9	1	7
VA:NORFOLK	9/ 4/84	1.64 0.13	4	7	-3	9	2	7
VT:BURLINGTON	9/ 7/84	1.93 0.25	4	18	3	19	9	14
WA:SEATTLE	9/ 4/84	1.45 0.12	4	7	1	9	5	7
WI:MILWAUKEE	9/28/84	1.51 0.12	2	7	-2	9	1	7
WV:CHARLESTON	9/25/84	1.46 0.12	4	7	-3	9	3	7
WY:LARAMIE	9/ 5/84	1.59 0.13	3	7	-4	9	1	7

NS NO SAMPLE
s SIGMA COUNTING ERROR

TABLE 16

STRONTIUM-90 AND STRONTIUM-89 IN PASTEURIZED MILK

ANNUAL REPORT

JULY - SEPTEMBER 1984

EPA REGION		^{90}Sr pCi/l ± 2s		^{89}Sr pCi/l ± 2s*	
AK:PALMER	9/18/84	1.1	0.7	0	1
AL:MONTGOMERY	7/ 6/84	3.1	0.8	0	1
AR:LITTLE ROCK	7/ 2/84	4.1	0.7	1	1
AZ:PHOENIX	7/ 5/84	0.1	0.9	1	1
CA:LOS ANGELES	7/12/84	-0.3	0.4	1	1
CA:SACRAMENTO	7/ 2/84	0.1	0.5	1	1
CA:SAN FRANCISCO	7/ 3/84	-0.1	1.2	1	2
CO:DENVER	7/ 2/84	1.6	0.6	0	1
CT:HARTFORD	7/16/84	2.4	1.0	0	1
DC:WASHINGTON	7/ 6/84	2.0	0.8	0	1
FL:TAMPA	7/ 3/84	1.6	1.0	0	1
GA:ATLANTA	7/ 2/84	2.0	0.4	0	0
HI:HONOLULU	7/ 1/84	1.3	0.6	0	1
IA:DES MOINES	7/ 9/84	2.0	0.6	1	1
IL:CHICAGO	7/10/84	2.5	0.2	0	0
IN:INDIANAPOLIS	7/ 2/84	2.6	0.4	0	1
KS:WICHITA	7/ 2/84	2.9	0.3	0	0
KY:LOUISVILLE	7/ 3/84	2.8	0.3	-1	0
MA:BOSTON	7/10/84	2.9	1.1	0	1
MD:BALTIMORE	7/ 6/84	2.5	0.8	0	1
ME:PORTLAND	7/ 3/84	3.0	0.7	0	1
MI:DETROIT	7/ 5/84	2.7	0.6	0	1
MI:GRAND RAPIDS	7/ 2/84	3.6	0.9	1	1
MN:MINNEAPOLIS	7/ 9/84	3.4	0.8	0	1
MN:ST. PAUL	7/ 3/84	4.1	0.7	-1	1
MO:KANSAS CITY	7/ 5/84	2.7	0.5	0	1
MO:ST. LOUIS	7/13/84	2.1	0.6	1	1
MS:JACKSON	7/ 9/84	2.6	0.6	0	1
MT:HELENA	7/10/84	1.4	0.8	0	1
NC:CHARLOTTE	7/ 2/84	2.6	1.0	0	1
ND:MINOT	7/27/84	2.5	0.8	0	1
NE:OMAHA	7/ 6/84	2.3	0.5	0	1
NH:MANCHESTER	7/ 2/84	2.3	1.0	1	1
NJ:TRENTON	7/ 5/84	2.3	1.3	0	2

TABLE 16 (CONTINUED)

STRONTIUM-90 AND STRONTIUM-89 IN PASTEURIZED MILK

ANNUAL REPORT

JULY - SEPTEMBER 1984

EPA REGION		^{90}Sr pCi/l ± 2s		^{89}Sr pCi/l ± 2s*	
NM:ALBUQUERQUE	8/ 6/84	1.2	0.3	0	0
NV:LAS VEGAS	7/23/84	-0.2	0.2	1	0
NY:BUFFALO	7/10/84	2.4	0.7	0	1
NY:NEW YORK CITY	7/ 2/84	3.8	0.9	-1	1
NY:SYRACUSE	7/ 2/84	2.8	0.8	0	1
OH:CINCINNATI	7/ 9/84	1.7	0.5	0	1
OH:CLEVELAND	7/ 9/84	3.4	1.0	-1	1
OK:OKLAHOMA CITY	7/23/84	4.7	0.3	-1	0
OR:PORTLAND	7/ 2/84	1.3	0.9	0	1
PA:PHILADELPHIA	7/ 2/84	2.8	0.5	-1	1
PA:PITTSBURGH	7/ 3/84	3.7	0.5	-1	1
PC:CRISTOBAL	7/26/84	1.2	0.6	0	1
PR:SAN JUAN	7/16/84	0.0	0.4	1	0
SC:CHARLESTON	7/12/84	2.6	0.4	-1	0
SD:RAPID CITY	7/ 5/84	2.4	0.4	0	0
TN:CHATTANOOGA	7/ 2/84	2.0	0.9	1	1
TN:KNOXVILLE	8/ 6/84	3.2	1.0	-1	1
TN:MEMPHIS	7/25/84	2.7	0.5	0	1
TX:AUSTIN	7/ 2/84	-0.2	1.4	2	2
UT:SALT LAKE CITY	8/ 5/84	0.7	0.6	1	1
VA:NORFOLK	7/19/84	2.2	0.7	0	1
VT:BURLINGTON	7/ 5/84	2.4	0.6	-1	1
WA:SEATTLE	7/ 2/84	0.8	1.6	2	2
WA:SPOKANE	7/ 2/84	2.1	0.9	0	1
WI:MILWAUKEE	8/31/84	1.7	1.2	1	2
WV:CHARLESTON	7/18/84	2.5	0.6	0	1
WY:LARAMIE	7/13/84	1.7	0.5	0	1

s SIGMA COUNTING ERROR
s* ANALYTICAL ERROR TERM WHICH CLOSELY APPROXIMATES THE COUNTING ERROR

Carbon-14 in Milk

Nine stations, chosen for wide geographical distribution, contribute milk samples for annual analysis for carbon-14. These samples have monitored the carbon-14 levels in the food chain resulting from nuclear testing.

Analysis consists of combusting the samples and measuring released carbon dioxide through liquid scintillation.

Data will be published as it becomes available.

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